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Vol. 2

# GOVERNMENT COMPETITION WITH BUSINESS: LIQUID OXYGEN PRODUCTION

THE UNIVERSITY OF MICHIGAN
JUN 28 1960
MAIN READING ROOM

## HEARINGS

BEFORE A

## SUBCOMMITTEE OF THE SELECT COMMITTEE ON SMALL BUSINESS UNITED STATES SENATE

EIGHTY-SIXTH CONGRESS

SECOND SESSION

ON

AIR FORCE PLAN TO BUILD LIQUID OXYGEN PLANTS IN COMPETITION WITH PRIVATE ENTERPRISE

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MAY 12 AND 13, 1960

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# GOVERNMENT COMPETITION WITH BUSINESS: LIQUID OXYGEN PRODUCTION

THURSDAY, MAY 12, 1960

U.S. SENATE,
SELECT COMMITTEE ON SMALL BUSINESS,
SUBCOMMITTEE ON RELATIONS
OF BUSINESS WITH GOVERNMENT,
*Washington, D.C.*

The subcommittee met, pursuant to notice, at 10:05 a.m., in room 457, Old Senate Office Building, Senator Alan Bible, acting chairman of the subcommittee, presiding.

Present: Senators Bible, Bartlett, and Gruening.

Also present: Walter B. Stults, staff director; Wiley S. Messick, counsel; William D. Amis, professional staff member; Harold Putnam, counsel; Allen Lesser, legislative assistant to Senator Javits; Catharine Guyon, legislative assistant to Senator Scott.

Senator BIBLE. The hearing will come to order.

I might say before we actually start into the hearing that the Senate is in session this morning and we have a number of votes that are contemplated. We will of necessity be required to take a recess now and then.

I just want to make a short opening statement and then, since I see we have with us my distinguished colleague from Alaska, Senator Gruening, who is very interested in this problem, I am going to ask that he be our first witness. I know he has other commitments.

Would you like to sit up here, Senator Gruening?

Senator GRUENING. Thank you very much, Mr. Chairman.

Senator BIBLE. The interest of the Senate Small Business Committee in this field has a long record. Back in the fall of 1953, we held hearings on the subject of Government competition with small business. At that time, Charles Thomas was Assistant Secretary of Defense for Supply and Logistics. Secretary Thomas made the following statement to our committee:

> It will be the Department of Defense policy to get out of commercial and industrial-type activities to the maximum practicable extent, and this policy with respect to commercial and industrial-type activities is stated in a Department of Defense directive dated November 17, 1952, which provides, in part, as follows:
>
> "Such facilities will not be continued in operation where the required needs can be effectively and economically served by existing facilities of any department or where private commercial facilities are available, except to the extent that such private commercial facilities are not reasonably available or their use will be demonstrably more expensive or except where the operation of such facilities is essential for training purposes. No facilities, not in operation, shall be retained unless necessary for mobilization reserve. Cost accounting methods will be employed to assist in formulation of decisions concerning cross-servicing, establishment or continuance of such activities in or under the Department of Defense."

In its fourth annual report, issued on March 25, 1954, the committee noted that the Air Force had tried to justify its commercial-type operations on cost and other grounds, and only after those premises had proved to be termite ridden, did it fall back on the age-old "national security" justification. The committee concluded, as a result of its hearings on one particular commercial-type project that it—

strongly disapproves of the misleading statements, inferences and tactics by which the Department of Defense attempted to justify its competition with private industry.

Further hearings on the general subject were held by the committee on April 6, 1955. At that time, Percival Brundage, Director of the Bureau of the Budget, brought a statement to our committee from President Eisenhower, which reads as follows:

The President expressed his policy in these terms:

To bring Government closer to the people we will set up these principles and adhere to them: That no Federal project, large or small, will be undertaken which the people can effectively do or be helped to do for themselves; that no Federal project will be undertaken which private enterprise can effectively undertake; that no project and no program will be started on the Federal level which can be undertaken and effectively carried through on the State or local level.

Mr. Brundage then presented a comprehensive statement indicating the steps being taken by the administration and the Bureau of the Budget to eliminate all possible Government competition with private business operations.

At the same time, a representative of the Defense Department also stated that the Pentagon was in high gear in its movement to get rid of commercial and industrial activities which could be carried out by private enterprise.

Two years later—on April 16, 1957—the Small Business Committee conducted another review of this continuing problem. Again we heard from the Director of the Bureau of the Budget, Percival Brundage, who was even more emphatic in his demand that Government competition must go and that his Bureau was accelerating its work in this field. Let me read briefly from his statement:

It is the policy of the administration to eliminate so far as practicable business operations of the Government which compete with private enterprise.

The Bureau of the Budget set forth the policy of the administration on this subject in its Bulletin No. 55–4 of January 15, 1955, as follows:

"It is the general policy of the administration that the Federal Government will not start or carry on any commercial activity to provide a service or product for its own use if such product or service can be procured from private enterprise through ordinary business channels."

The decision to continue or discontinue an activity as being in the public interest should not depend primarily upon whether the product or service can be produced cheaper by the Government. As a general guide our policy is that apparent cost or savings should not be a deciding factor where adequate competition exists. This policy was adopted for the following reasons:

(1) The costs of Government operations are not comparable with corresponding business costs. The Government, for example, pays no income taxes and operates its own tax-free facilities, thereby keeping costs down.

(2) Government accounts are not kept in the same manner as business accounts so that a comparison of the operating costs of Government versus business, for example, is not only difficult but often misleading.

(3) Above all, the decision whether to continue or discontinue a Government activity solely on an apparent cost basis runs counter to our concept that the Government ought not to compete in a private enterprise economy.

By the spring of 1957, we had a new Assistant Secretary of Defense for Supply and Logistics, but he was a very good man, who recognized the unfairness of this sort of competition, and made a fine witness before our committee. Perkins McGuire said:

As you know, the Department of Defense has had for some time a policy based on the principle that free competitive enterprise should be fostered by the Government. This policy in substance states that the Department of Defense should not carry on commercial- or industrial-type operations in competition with private enterprise unless such operations are necessary in the interest of national defense.

The Senate Select Committee on Small Business in its annual report on March 31, 1955 (S. Rept. 129, 84th Cong., 1st sess.) discussed this problem and was very pointed and constructive in its expression on this subject favoring the discontinuance of Government operations in competition with private enterprise. The committee also expressed hope that the Department of Defense would not rationalize such activities by drawing up the time-worn screen of national security, so-called dollar savings, the need for training personnel, and others. The report stated further that "the time has come when we need a straightforward aggressive attack upon a steadily growing cancer in our economy."

Earlier in my statement, I provided the committee with a copy of our definition of reasonable price, which in substance is that a commercial price will be considered reasonable when the price to the Government is not greater than the price paid by other purchasers considering the existence of adequate competition, volume of purchases, and quantity and quality of products and/or services obtained.

Our efforts to develop a reasonable formula to accomplish this was found to be impractical. The reason for this conclusion is that in developing the Government cost of providing a product or service for itself, an estimate must be made for such cost factors as Federal, State, and local taxes; depreciation of equipment and facilities; profits; and many other factors which are not reflected in Government cost records and must be considered in order to make a fair comparison. We have made several attempts at making cost comparisons and found that we were continually led into an accountant's paradise as estimates were constantly subject to challenge.

After those 1957 hearings, our committee issued a special report entitled "Government Competition With Private Business." Let me quote from that official document:

Your committee recommends—

That all Government agencies abstain from initiating any commercial activity and expedite the discontinuance of any such activity already engaged in which provides a product or service for Government use when such product or service may be obtained, with reasonable convenience, in like quality and quantity at a fair and reasonable price, through ordinary business channels. Exception should be made only when it is clearly demonstrated that the public interest is better served.

I apologize for this long discourse, but I did want everyone present to be aware of our committee's long record of work in this field—and even more importantly, I wanted to recall the statements of top administration and Defense Department official on the subject.

The purpose of today's hearing is twofold. First, the subcommittee wants to receive from the Bureau of the Budget and the Department of Defense progress reports on what success they have achieved in carrying out the provisions of the Bureau's Bulletins No. 55–4, of January 15, 1955; No. 57–7, dated February 5, 1957; and No. 60–2, issued September 21, 1959, in which the policy was established by the Bureau that all unnecessary commercial activities by Government agencies which infringe on the prerogatives of private enterprise be discontinued.

This is of great importance to small business because when any Government agency undertakes to make or provide a product or a service which can be supplied by private vendors, the victims of this type of competition are, in the majority of cases, small business concerns.

The second reason we are here is to afford to the Air Force an opportunity to justify its decision to build and operate about 70 liquid oxygen plants which, in most cases, would duplicate privately owned production facilities.

This decision, needless to say, is of vital concern to the liquid oxygen industry composed, as it is, essentially of small business concerns. The alarm which the decision of the Air Force has caused this industry is not unmixed with confusion. Some of these liquid oxygen producers are understandably perplexed, it seems to me, because in recent years they have been urged by the Government itself to build new plants and expand existing facilities so that they might meet requirements for liquid oxygen. This investment is now threatened.

In our study of the overall problem of Government competition with private business, we are happy to have with us, among others, representatives of the Bureau of the Budget.

We are happy to have this very imposing array of witnesses with us this morning.

I am particularly glad to note the presence of my distinguished colleague from the great and new State of Alaska, Senator Gruening. We shall be delighted to hear from you first, Senator Gruening.

## STATEMENT OF HON. ERNEST GRUENING, U.S. SENATOR FROM THE STATE OF ALASKA

Senator GRUENING. Thank you, Mr. Chairman, for giving me this opportunity to appear before your committee and speak in behalf of the interests of an important segment of small business of the State of Alaska and the Nation.

I also wish to take this opportunity to express the appreciation of Alaska businessmen to you for conducting this investigation of an action by the executive branch which appears as a threat to the continued success, if not the survival of certain commercial manufacturers of liquid oxygen.

The matter of competition by the Department of the Air Force with established commercial suppliers of liquid oxygen first came to my attention last fall, before my return to Washington for the second session of this Congress. I was informed by Mr. W. E. Buckow, president of the Alaska Chemical Corp., with manufacturing plants in Anchorage and Fairbanks, Alaska, that, despite the fact he had recently enlarged his plant for the purpose of providing increased supplies of liquid oxygen to Eielson Air Force Base at Fairbanks, Alaska, he had been informed by the Air Force base that his commercial supplies would no longer be needed by the Air Force, as it was planned that supplies for the base would be entirely provided by two standby generators installed there.

Now, at the time this news was communicated to me last fall, I was innocent enough to believe that this was a problem which could readily be solved merely by bringing it to the attention of the executive branch of the Government.

Had not this administration stated repeatedly that one of its primary aims is to restore to private enterprise the responsibility for providing the Government with those supplies which can most efficiently be produced by private enterprise?

Was this not this administration which had promised to terminate all those activities of the Government which, when operated at the expense of the taxpayers, deprive businessmen of opportunities to sell their products to the Government?

Was this not this Government by its own repeated declarations dedicated to the welfare of the business community of the Nation?

Was this not this administration which had issued a directive, under the imprimatur of the Bureau of the Budget, stating that "It is the general policy of the administration that the Federal Government will not start or carry on any commercial-industrial activity to provide a service or product for its own use if such product or service can be procured from private enterprise through ordinary business channels?"

Were we not dealing with the same Department of Defense which echoed the policy of the Bureau of the Budget in its own directives?

Was this not the administration which, in October 1953, had established the Business and Defense Services Administration of the Department of Commerce for the purpose of investigating, and, presumably, eliminating complaints of private industry concerning Government activities which compete with commercial enterprise?

Believing, as I did, that this administration meant to give the private businessman a break, I believe I may be forgiven for expecting that my constituent, Mr. Buckow, would get a satisfactory answer to his question as to why the Air Force must manufacture its own liquid oxygen despite the fact he had been providing adequate supplies in the past and was still equipped to meet the needs of Eielson Air Force Base.

Believing that this administration would lend a sympathetic ear, letters were addressed, in succession, to the Department of Defense, to the Director of the Bureau of the Budget, and to the Department of Commerce, hoping that we would discover that the Alaska Chemical Corp. could, after all, rest securely in the knowledge that its business of supplying liquid oxygen to the Air Force would not be taken away by its former customer.

Unfortunately, we found that the situation was not as we had believed and hoped. We found, through a succession of replies to our inquiries for enlightenment that plain words of policy statements simply do not mean what they appear to say. Further, we found that the expressed intent of this administration to give private enterprise a break in its dealings with the Government seems to be frustrated at every turn. It seems that, despite the expressed policies of the President, there are innumerable ways in which these policies can be and are being circumvented. There is cause for admiration of the inventiveness we have observed in officials of the executive branch who can find ways of doing that which it would appear they are forbidden to do.

So it really came as no complete surprise when we found that Alaska was not the only State and the Alaska Chemical Corp. was not the only private manufacturer which was required to face the

possibility of increased Air Force production of liquid oxygen, resulting in decreased sales by private suppliers. The announcement of the Air Force that it plans to construct 70 liquid oxygen manufacturing plants at bases all over the country simply means that another threat has arisen to set the strength of private industry throughout the United States.

There are representatives here from commercial firms in the business of producing liquid oxygen who are better equipped than I to give you details as to the effects upon their business of these plans of the Air Force for expanded production of liquid oxygen. Thus, I will not dwell on the obvious problems, human and real, which will beset the liquid oxygen manufacturing business.

There is an aspect of the matter which I would like to bring to your attention. That is the overwhelming importance to our defense of maintaining strong and reliable commercial manufacturers to produce the goods needed for war, as well as for the avoidance of war. I am aware of the arguments of the Air Force that its contemplated expansion of liquid oxygen production is necessary to the defense effort. This is an argument which we may not dare take lightly.

However, it seems to me to be of even greater importance that we recognize clearly the need for maintenance of an adequate mobilization base for our Armed Forces. The military can never be entirely self-sufficient under our system of government. It is essential to the Armed Forces, it is essential to democratic government that the resources of American industry be utilized to the utmost in carrying out our defense mission. Commercial manufacturers of items needed for defense must be partners with the military. They cannot be placed in a role in which their services can be discarded at will. To say nothing of the personal sacrifices incident to such a policy, the fact is that American private industry cannot be turned off and on at will. The investment of human ingenuity and economic resources needed to produce commodities essential to our welfare cannot be supplied at the drop of a brass hat. These are resources which must be utilized and not allowed to go to waste.

It is important to keep the commercial suppliers of liquid oxygen in a strong position to supply our needs of this commodity when those needs arise. Action of the Department of Defense which results in a weakening of their economic strength may well be remembered with dismay should the day come when their production is desperately needed, and it is not there.

Another argument which must be made for maintaining our commercial suppliers in a strong position is that of the benefits derived by the general public from tax revenues paid by private business concerns. It is apparent that as we allow the military to preempt the function of producing commodities which can be produced and sold by private enterprise, there will be a corresponding decrease in taxes payable on profits earned by commercial industry. Economic strength is essential to military strength. The support of our necessarily enormous Military Establishment is largely dependent upon the maintenance of a sound tax base to support activities not only of the Federal Government, but, also, of the States and municipalities of the United States.

There have been recent reports in the press that our American war industry, which was largely a product of World War II, is aging,

and there are serious doubts as to the ability of U.S. producers to supply the military with its needs of the day. This is another reason for applying defense procurement policies which will protect and not dissipate resources of commercial firms now qualified to supply military requirements.

I urge this committee to investigate the proposed expansion of Air Force production of liquid oxygen with great care, and I am hopeful the result of this investigation will be the application of a policy by the administration which will surely result in maintaining the strength of our Armed Forces, as well as the welfare of our citizens, as well as adherence to their oft-declared policies.

Senator BIBLE. Thank you very much, Senator Gruening, for a very careful and thorough statement and analysis of the problem that we have before us this morning. You are certainly welcome to stay at this hearing as long as you like, but, if you have other commitments, I am sure we appreciate that.

Senator GRUENING. I would like to remain here as long as I can, although I do have other commitments which will take me away for a time.

Senator BIBLE. Very well.

I would like to have inserted in the record at this point a letter of May 11 from Senator Beall, of Maryland, and a statement from Representative Ralph J. Rivers, of Alaska, both concerning this proposed procurement by the Air Force of liquid oxygen plants. I would likewise like to have inserted in the record at this point a letter from the Portland Chamber of Commerce concerning this problem.

(The letters referred to are as follows:)

U.S. SENATE,
*May 11, 1960.*

Hon. JOHN SPARKMAN,
*Chairman, Senate Small Business Committee,*
*Washington, D.C.*

DEAR SENATOR SPARKMAN: I am extremely glad that your committee is investigating the proposed procurement by the Air Force of 70 liquid oxygen plants, and I would appreciate it greatly if you would have this letter of mine made a part of your hearings.

In 1958, the U.S. Government determined, because of military considerations, that additional productive capacity of liquid oxygen and liquid nitrogen was required in the United States. Accordingly, the Government approached the compressed gas industry asking that it build such plants; and, as an inducement, authorized accelerated tax amortization by the issuance of certificates of necessity. At that time industry rose to the occasion so that the Business and Defense Services Administration received more applications than they were authorized to issue to make up the shortage anticipated by the Department of Defense.

It is now very difficult for me to understand the Government encouraging private enterprise to invest its capital and build plants because of military considerations, and for the Air Force to come back a year and a half later with a procurement to purchase its own plants and go into direct competition with the plants built under certificates of necessity.

I further protest this procurement on the basis of economics. It is estimated that these 70 plants will cost from $100,000 to $150,000 each (the Navy has just purchased one for use aboard a submarine tender at a price of $230,000). By the time the Air Force constructs buildings to house these liquid oxygen and liquid nitrogen plants, purchases spare parts, installs the equipment, and trains the personnel, the total expenditures would be in the neighborhood of $25 million.

In addition, it is my opinion that the liquid oxygen and liquid nitrogen produced by these small plants will cost two to three times the price the Air Force is now paying private enterprise. In addition to this, it would be reducing the Government's tax revenue from industry.

I know these factors will be given the most careful consideration by the members of your group in their study of this important matter.

With all good wishes, I am

Sincerely yours,

J. GLENN BEALL.

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STATEMENT OF HON. RALPH J. RIVERS, U.S. REPRESENTATIVE FROM ALASKA, BEFORE THE SUBCOMMITTEE ON RELATIONS OF SMALL BUSINESS WITH GOVERNMENT, OF THE SENATE SELECT COMMITTEE ON SMALL BUSINESS, IN REGARD TO THE PROPOSAL OF THE AIR FORCE TO BUILD 70 LIQUID OXYGEN PLANTS IN COMPETITION WITH PRIVATE ENTERPRISE

Mr. Chairman, I am pleased to have the opportunity of joining with my many colleagues and others who have preceded me as witnesses in this investigation in opposition to recent action of the Air Force seeking to effectuate construction of 70 liquid oxygen plants in competition with private enterprise. Two of such proposed plants are slated to be located at Eielson Air Force Base near Fairbanks, Alaska, and one at Elmendorf Air Force Base near Anchorage, Alaska.

This strikes close to home as the Alaska Chemical Co., Inc., founded in Fairbanks in 1941 and expanded to a plant in Anchorage in 1952, has supplied liquid oxygen to the Armed Forces in Alaska through all the intervening years notwithstanding the fact that for the last several years the Air Force has insisted upon supplying a portion of its liquid oxygen needs at four small plants which it already operates in Alaska—two at Eielson Air Force Base and two at Elmendorf Air Force Base. These Air Force plants were installed and have been operated notwithstanding the capacity and willingness of Alaska Chemical Co., Inc., to supply the full liquid oxygen requirements of the military in Alaska.

Without criticism of the Air Force for having constructed several large plants within the United States to meet its quantity liquid oxygen needs for missiles, it seems to me that this recent proposal to expand its activity to supply its other requirements, with a consequent withdrawal of patronage from the many small producers who have served so well, is harsh, uneconomical, and contrary to the official policy of the executive branch as expressed by Bulletin No. 60–2 of the Bureau of the Budget (September 21, 1959) and the Department of Defense Directive 4100.15.

The illogic of the situation with which we are now confronted is especially apparent with respect to Alaska. During all the years when the hard core of our northwestern national defense capability in the rail belt of Alaska was regarded as indispensable because of the recognized strategic location of Alaska as the corridor between Asia and North America, the existing arrangements for liquid oxygen arrangements were treated as adequate.

Now consider the picture. About a year ago the Army canceled all of its requests for public land withdrawals for missile sites, the Air Force has just announced that for budgetary reasons it is immediately phasing out the 449th Fighter Interceptor Squadron at Ladd Air Force Base—only 600 miles from Siberia—which is a virtual abandonment of Ladd Air Force Base by the Air Force, and General LeMay has recently stated that he does not consider Alaska to be of any particular strategic importance to the United States in terms of global warfare, to all of which the arguments of the Senators from Alaska and myself were of no avail. In the midst of all this masterminding with resultant partial withdrawal from Alaska, the Air Force wants to build two new oxygen plants to support its reduced operations in Alaska with an incidental knockout blow at a dependable small industry which has served it for years. The much-stressed budgetary considerations appear to have been forgotten.

On the subject of budgetary considerations from a nationwide standpoint the Air Force insists that the total cost of the 70 new liquid oxygen units will be approximately $7 million over a 2-year period. The Comptroller General in attempting to justify the Air Force says in a letter to me, dated May 13, 1960, that the figure will be about $8 million. Competent testimony adduced at this hearing shows that either of these two figures will not much more than procure the manufacturing units, including crating, shipping, and delivery to the proposed sites. I am told that neither of these figures includes the 70 buildings necessary for housing these units, or the wiring and piping, instrumentation for testing the product, the storage tanks, the diesel or gasoline power prescribed for deployability, or the training manual and training program.

What I am saying is consistent with the charge made by the Alaska congressional delegation that the Air Force is embarking upon an unnecessary program which would cost $40 million, in the face of its protestations of budgetary difficulties and desire to obtain a maximum national defense result for each dollar spent. When all the elements are put together as I have just indicated, and based upon experience with the toe-in-the-door technique, I have small doubt that the $40 million figure would in the next 4 years prove to be closer to correct than the $7 to $8 million cited by the Air Force and the Comptroller General.

It is also likely, as shown by competent evidence heretofore presented to this committee, that if the Air Force does go through with this program, it would succeed in the next 10 years in manufacturing liquid oxygen for its own account at an approximate operating cost of $925,000 as against what private industry would charge for the same result in the approximate sum of $510,000.

In closing, I also challenge the idea that building such plants on Air Force bases, which are prime targets, would do any good from the standpoint of combat capability after putting many small producers out of business. If the Air Force premise that these proposed plants will secure combat capability is wrong, then its whole line of reasoning is erroneous. It seems to me, although I speak only as a layman, that we are faced with a situation wherein the Air Force has indulged in a self-serving, unwarranted assumption leading to a foregone conclusion, which is being insisted upon regardless of all the evidence to the contrary. I suggest that all proper means be used to dissuade or bar the Air Force from proceeding with what I term its proposed ill-advised activity which is the subject of this hearing.

Thank you, Mr. Chairman and members of this committee, for this opportunity to be heard.

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WASHINGTON, D.C., OFFICE,
PORTLAND CHAMBER OF COMMERCE,
*Washington, D.C., May 11, 1960.*

Hon. ALAN BIBLE,
*Acting Chairman, Subcommittee on Relations of Business with Government, Senate Office Building, Washington, D.C.*

DEAR SENATOR BIBLE: My organization, the Portland, Oreg., Chamber of Commerce, is not asking for time to be heard orally tomorrow on the hearing concerning the Air Force's plan to spend some $40 million in erection of oxygen plants at airbases over the United States. We know the oxygen industry directly concerned has numerous witnesses who are experts in the matter, and we do not wish to intrude on their time.

However, the Portland, Oreg., Chamber of Commerce would appreciate if your committee would include this letter in your records and consider it in your deliberations.

Our organization, in the light of such facts it has from oxygen producers in its own area and in other parts of the United States, is strongly opposed to an arm of the Federal Government going into competition with private industry. On information available, we see no reason why the Air Force should enter wholesale production of oxygen. The product is a common one, generally used throughout the United States. It would appear about as logical for the Air Force to grow wheat from which to manufacture flour for its personnel.

These oxygen producers throughout the United States support payrolls and pay taxes from which our defense arms and other elements of the Government derive essential funds for their existence and operation.

There may be a few locations of airbases far from dependable supply of oxygen. We are certain the private oxygen producers would not object to establishments of plants in such areas, if the need is proven. But we can see no justification otherwise.

Our organization would urge that this committee prevail on the Air Force to discard its plan for competition with private industry; or failing in that effort, that it take steps in the Congress to prevent expenditures for this purpose.

Sincerely,

HAROLD B. SAY,
*Washington, D.C., representative of the Portland, Oreg., Chamber of Commerce.*

Senator BIBLE. Senator Bartlett, I am very happy to welcome you to the committee this morning. Do you care to make a statement on the problem at this time?

Senator BARTLETT. No, thank you, Mr. Chairman. I am glad to be here and shall listen to the testimony with great interest.

Senator BIBLE. Very well.

Our first witness this morning is the Deputy Director of the Bureau of the Budget, Elmer B. Staats.

I am very happy to see you here. Will you introduce those who are accompanying you?

## STATEMENT OF ELMER B. STAATS, DEPUTY DIRECTOR, BUREAU OF THE BUDGET; ACCOMPANIED BY GORDON D. OSBORN AND WILLIAM WOHLFELD, STAFF MEMBERS

Mr. STAATS. Yes, sir.

This is Mr. Gordon Osborn at my left and Mr. William Wohlfeld at my right. I think the reporter has the full names and full titles, Mr. Chairman.

Senator BIBLE. Gordon Osborn and William Wohlfeld. All right, Mr. Staats.

Mr. STAATS. Mr. Chairman and members of the committee, I appreciate the opportunity to review with this subcommittee the overall policy and program of the executive branch to reduce Government competition with private enterprise. The Bureau of the Budget welcomes the support which this committee has provided in the common objective of the legislative and the executive branches to bolster small business and the free enterprise system.

Approximately 3 years ago, the Bureau of the Budget appeared before your subcommittee to discuss this subject and to explain the program of the executive branch to evaluate those activities where the customer is the Government itself.

Today, I would like to bring you up to date on the program to reduce Government competition with business. I will cover (1) a brief résumé of the program from its beginning, (2) the changes made to the program as a result of experience gained, (3) accomplishments of civilian agencies, and (4) the program in the Department of Defense with specific reference to the Air Force's liquid oxygen-making activities.

The program to reduce Government competition with business was launched with Bureau of the Budget Bulletin No. 55–4 in January 1955. That bulletin established—

> the general policy of the administration that the Federal Government will not start or carry on any commercial activity to provide a service or product for its own use if such product or service can be procured from private enterprise through ordinary business channels. Exceptions to this policy shall be made by the head of an agency only where it is clearly demonstrated in each case that it is not in the public interest to procure such product or service from private enterprise.

I am quoting from the bulletin of January 1955.

Government agencies were required under Bulletin No. 55–4 to do two things: (1) report their commercial-industrial activities and (2) evaluate their Government-operated manufacturing activities to de-

termine which ones should be continued or terminated in accordance with the general policy. Agencies' inventory reports were later compiled by the Bureau of the Budget in "An Inventory of Certain Commercial-Industrial Activities of the Government," issued in May 1956.

As the next phase in this program, Bulletin No. 57–7 was issued on February 5, 1957. The general policy was restated, and, in addition, instructions were included for the evaluation of commercial-industrial activities classified as services, the termination of existing activities, and the starting of new ones. In both Bulletins Nos. 55–4 and 57–7, relative costs of Government operation, compared to procurement from commercial sources, were to be considered only when the agency head concluded that the product or service could not be purchased on a competitive basis and could not be obtained at a reasonable price from private industry. Both bulletins provided special administrative arrangements for the Department of Defense.

Valuable experience was gained from reviewing the agencies' reports and discussing the program with agency officials. The Bureau's staff took a firsthand look at some of the activities at the Agricultural Research Center in Beltsville, the National Institutes of Health, the Tennessee Valley Authority, St. Elizabeths Hospital, and several Veterans' Administration hospitals.

From those reviews and discussions, it became evident that it was necessary to clarify the data included in the "Inventory" published in 1956. The basic purpose of that publication was to serve as a frame of reference for evaluating existing governmental commercial-industrial activities. Those evaluations, in addition to identifying installations to be discontinued or curtailed, helped clarify the magnitude of actual Government competition with private enterprise. Although the civilian agencies reported more than 19,000 commercial-industrial installations, most of these were not competitive with private enterprise. For example, of the 10,850 service installations evaluated under Bulletin No. 57–7, 8,000 were in post offices, where it was not feasible to contract for janitorial services, floor washing, maintenance and minor repairs, guards, or postal equipment repairs. A similar instance occurred in the "Inventory" trucking and warehousing category. Examination showed that of the 4,753 installations in that group, 4,531 were bins owned by the Commodity Credit Corporation for the storage of grain. There has since been a reduction of 610 bin sites, but the remaining 3,921 bin sites are required in producing areas where it would be administratively impractical to use privately owned facilities. Some 400 activities in other agencies were found to be essential to provide therapy for patients and inmates of Federal hospitals or institutions. Procurement of some products or services from commercial sources was not possible on remote Indian reservations. A similar probem of commercial unavailability occurred in certain research and development activities of the National Aeronautics and Space Administration, the National Institutes of Health, and the National Bureau of Standards which required highly specialized equipment. National security was found to be a factor for determining the use of Government-owned facilities for the design, development, and testing of atomic weapons.

As a result of the experience gained under Bulletins Nos. 55–4 and 57–7, we concluded that it would be necessary to spell out and develop more specific and uniform criteria for determining the application of the policy in specific situations.

Another conclusion arrived at was that we needed better criteria for making decisions where cost differentials were an important consideration. We found that the costs of Government operation and private procurement could be usefully compared, provided they were both fairly computed and complete. Costs assigned to Government operation, in order to be comparable, would have to cover all direct and indirect outlays as well as elements not usually chargeable to current appropriations. Costs attributed to procurement from private sources would also have to be computed on an equally fair and complete basis. We realized that some cost items could only be estimated; therefore, the principle was developed that procurement should be from commercial sources unless the difference in comparable cost was relatively large and disproportionate.

In other words, we were saying that we would err on the side of Government contracting with private enterprise, rather than doing it ourselves if precise cost determinations could not be made.

Lastly, we concluded that this program was of significant value to agency heads in deciding whether to start new Government installations or to effect procurement from commercial sources. Furthermore, it is our belief that the analyses required in the bulletins also helped stimulate improvements in management and operations.

What we are saying here is that we feel that the net result of the agencies themselves having to make the kinds of analyses we have required under this bulletin has had an important beneficial effect of its own, which we could not measure in any statistical fashion.

After full discussion with officials from the principal agencies concerned, the President approved the clarifications and modifications proposed for the program. Those changes were incorporated in Bulletin No. 60–2, issued on September 21, 1959. The stated purpose of that bulletin was: (1) to clarify the program based on experience gained from its predecessor bulletins; and (2) to complete the evaluations of all remaining activities. The general policy remained essentially unchanged. Bulletin No. 60–2 pointed out that—

> because the private enterprise system is basic to the American economy, the general policy establishes a presumption in favor of Government procurement from commercial sources. This has the twofold benefit of furthering the free enterprise system and permitting agencies to concentrate their efforts on their primary objectives * * *.

Bulletin No. 60–2 recognized that there are factors which may make it necessary or advisable for a Government agency to produce goods or services for its own use. The burden of proof, though, was clearly on the agency to provide compelling reasons for justifying exceptions to the general policy. Guidelines and criteria were provided for determining whether compelling reasons existed due to (1) national security; (2) relatively large and disproportionately high costs; or (3) clear unfeasibility. This latter reason, clear unfeasibility, was to be used when the product or service was an integral function of the agency's basic mission or was not available commercially now or in the foreseeable future. It was also applied when it was found admin-

istratively impractical to contract for a service or product commercially. Agencies were to report on the current status of those activities evaluated previously as well as to complete the evaluation of all remaining categories, such as transportation, communications, warehousing, utilities, and Government-owned, contractor-operated facilities. Evaluations were to be made of all new starts, regardless of their size, established between January 1, 1957, and July 31, 1959. Special administrative arrangements made with the Department of Defense extended its evaluation schedule through March 1961.

Our review of agency reports submitted under Bulletin No. 60–2 is continuing. Because I believe you will be interested in knowing some of the overall results of this program, I have had compiled some preliminary statistics for this hearing. I must advise you that I have not had a full opportunity to examine these figures in detail, but I believe they fairly represent the program's accomplishments in civilian agencies. These preliminary statistics are presented for the record.

(The statistics referred to, follow:)

PRELIMINARY STATISTICS OF EVALUATION REPORTS OF COMMERCIAL-INDUSTRIAL INSTALLATIONS IN CIVILIAN AGENCIES SUBMITTED IN ACCORDANCE WITH BUREAU OF THE BUDGET BULL. NO. 60–2

| | | |
|---|---|---|
| 1. Installations in the inventory published in May 1956 from agencies' reports submitted under Bull. No. 55–4 and new starts between January 1955 and December 1956 reported under Bull. No. 57–7 | | 19,333 |
| 2. Adjustments due to mergers or errors | | −430 |
| 3. Revised number of installations | | 18,903 |
| 4. Agencies' actions taken as of July 31, 1959: | | |
| (a) Discontinued | | −1,516 |
| (b) Curtailed | 226 | |
| (c) Continued | 17,161 | |
| 5. Installations not discontinued | | 17,387 |
| 6. Agencies' actions to be taken after July 31, 1959: | | |
| (a) Discontinue | | −116 |
| (b) Curtail | 211 | |
| (c) Continue | 17,060 | |
| 7. Remaining installations not discontinued | | 17,271 |
| 8. New starts between January 1957 and July 1959 | | 236 |
| 9. Total remaining installations and new starts | | 17,507 |
| 10. Agencies' compelling reasons for remaining installations and new starts: | | |
| (a) National security | | 216 |
| (b) Costs | | 133 |
| (c) Clear unfeasibility: | | |
| (1) Basic mission | | 1,266 |
| (2) Unavailable commercially | | 9,727 |
| (3) Administratively impractical | | 6,165 |

Mr. STAATS. I will simply describe the highlights of these statistics. Examination of those statistics shows the following:

1. The number of installations in the Inventory published in May 1956 derived from reports submitted by civilian agencies under Bulletin No. 55–4 and new starts reported under Bulletin No. 57–7 totaled 19,333.

This is just for the civilian agencies, Mr. Chairman.

2. Adjustments made to that total number of installations due to mergers and transfers of installations or correction of agencies' previous reports reduced the 19,333 by 430 installations to a revised total of 18,903.

3. As of July 31, 1959, the civilian agencies had taken action to discontinue 1,516 of those installations. An additional 226 had been curtailed and 17,161 installations were continued.

4. This then left a balance of 17,387 installations in a curtailed or continued status as of July 31, 1959.

5. Of that balance of 17,387 installations on July 31, 1959, the agencies indicated plans to discontinue 116 in the future, to curtail 211 more, and to continue 17,060.

6. These actions would then leave a balance of 17,271 installations in a curtailed or continued status.

7. The number of new installations reported by the civilian agencies as having been started between January 1, 1957, and July 31, 1959, totaled 236.

8. In examining the compelling reasons for retaining the 17,271 installations after July 31, 1959, in a continued or curtailed status, and the need to establish the 236 new installations, the agencies justified the majority of them, or 17,158, on the grounds of clear unfeasibility.

I thought here it would be helpful to give you a little breakdown of these:

(*a*) In 1,266 cases the installation was reported as being integral to the basic mission of the agency.

(*b*) In 9,727 cases commercial sources were not available. This includes the 8,000 post offices previously mentioned.

(*c*) In 6,165 cases it was reported to be administratively impractical to utilize commercial sources. This includes the 3,921 Commodity Credit Corporation-owned bin sites.

In addition, 216 installations were justified for reasons of national security, and 133 were justified because of the higher costs entailed in procurement from commercial sources.

As I have mentioned, these are preliminary figures. They do not reflect military activities, which I understand will be covered today by representatives of the Department of Defense. This committee will be furnished with complete data when it is available.

At this point I would like to outline the role of the Bureau of the Budget. The preliminary results I have noted above represent decisions made fundamentally by the heads of the agencies or their delegated subordinates. Those decisions were made in accordance with Bureau of the Budget bulletins issued by direction of the President. Responsibility for carrying out the President's program rests primarily upon the heads of the agencies. The Bureau of the Budget has had a dual role in this program. Our responsibility has been to supply the guidelines to the executive agencies and to review the extent and reasonableness of their performance.

Agencies' reports were reviewed by the Bureau staff who were most knowledgeable about the agencies' programs and fiscal requirements. In some instances, agencies' evaluations were marked for future followup and onsite examination. Special studies were instituted in order to evaluate adequately the more complex activities, such as the Vet-

erans' Administration hospital laundries or the role of the Military Air Transport Service in peace and war. These intensive studies have required substantial time and effort. Sometimes private industry participates actively in these studies. For instance, six private companies are spending an estimated $250,000 to determine whether the economics of processing spent nuclear fuel elements justify the construction of processing facilities by private industry. The results of their study will have a bearing on future modifications of plants owned by the Atomic Energy Commission.

In your April 27, 1960, letter to the Director of the Bureau of the Budget, you expressed an intention to inquire specifically into the Air Force's liquid oxygenmaking activities. When we requested the Department of Defense to make an appropriate investigation, we learned that they were already engaged in preparing a reply to other inquiries. We have reviewed with Department of Defense officials the evaluation they have made of this activity. That evaluation showed that the basic decision centered around the need to maintain a self-sufficiency to meet war requirements for essential liquid oxygen at bases assigned a war mission. The Air Force plans to continue to procure a substantial quantity of liquid oxygen from commercial sources, but, as a matter of national security, total reliance will not be made on such sources. The evaluation and the fundamental decision which found national security a factor warranting an exception to the general policy outlined in Bulletin No. 60–2 were the responsibility of the agency's officials, in this case, the Secretary of the Air Force and the Secretary of Defense. It is my understanding that officials from the Department of Defense are prepared to present to this committee a review of the liquid oxygen decision.

Before I close, I would like to say a word about the program in general in the Department of Defense. In line with this committee's August 1957 report, we too are aware that the Defense Department, because of the nature of its activities, has the greatest amount of commercial-industrial activity. Due to the size and complexity of military activities, special administrative arrangements have been made with that Department to extend the evaluation schedule through March 1961. The decisions to be made are not always easy and frequently involve considerable expenditure of effort by staff and by responsible officials. We have worked closely with the Department of Defense in developing its general program.

In looking to the future of this program, we plan to continue to pursue actively the general policy of reducing Government competition with private enterprise. From the preliminary results, it appears that there is a compelling requirement for most of the existing governmental activities in the civilian agencies. At this point, it seems most fruitful to channel our major efforts into reviewing proposed new activities. The Bureau of the Budget will emphasize this aspect of Bulletin No. 60–2 on a regular basis as part of its normal budgetary reviews. We shall look forward to your continued support, Mr. Chairman.

Senator BIBLE. Thank you very much, Mr. Staats, for your very helpful progress report. Your appearance here today I am sure is prompted by my letter to you dated April 27, 1960, and I would like to probe this particular report. I would like to discuss with you for

a few moments this particular problem, this liquid oxygen-making activity, and the present procurement which necessitates this hearing.

As I understand your statement, the letter of April 27, 1960, is the first knowledge that you had of this problem.

Did you know the Air Force was about to build 70 liquid oxygen plants as a part of the defense posture?

Mr. STAATS. Mr. Chairman, I would like to answer the question in this way: This program in the Department of Defense is not a new program which was just initiated, as you know. There has been an item carried in the budget as a general part of the Air Force budget for some time. The Bureau of the Budget, of course, has reviewed the Department of Defense budget and has included in its review the program of the Defense Department for the construction of the liquid oxygen-manufacturing plants.

Senator BIBLE. You say you have reviewed them?

Mr. STAATS. Yes.

Senator BIBLE. When did you make that review?

Mr. STAATS. This is on an annual basis. It is part of our annual budget review process. This would be one of the items that our staff would review in terms of whether or not it should or should not be included in the budget which is presented to the Congress. So, we have reviewed it in that context, in the annual budget review.

Senator BIBLE. Who specifically on your staff made that review, Mr. Staats?

Mr. STAATS. This would be made——

Senator BIBLE. You and I are both aware that this defense budget is a pretty voluminous and awe-inspiring document. Did you see a line item saying liquid oxygen plants, 70 of them, were to be constructed by the Air Force? Was this a line item in the budget?

Mr. STAATS. This would be right. This is a line item in the budget. All of the construction activities of this kind throughout the Department of Defense are shown as line items in the budget unless they are of such a highly classified nature that we put them under some blanket category.

Senator BIBLE. You say this is a line item and it was approved by the Bureau of the Budget. At the time you or your staff saw this line item, was your interest aroused by the possibility that it might be in competition with private industry? And was any inquiry made at that time concerning it?

Mr. STATTS. I would have to answer in this way, Mr. Chairman: I am sure the staff of our Military Division, which is the responsible part of the Bureau which reviews the Defense Department procurement program, was aware of it, and discussed it; but I would have to be very honest with you and say, as far as I am concerned personally, the letter of April 27, 1960, we received from you was the first time that this matter specifically came to my attention.

Senator BIBLE. I recognize you cannot have every one of these problems before you personally, but the thing I am trying to develop is, No. 1, when did you determine, or when did you first know that you had this item in the budget? Who was responsible for saying, "Well, this is all right," and what type of review did you make with the Air Force?

As I read your prepared statement, you say that you checked this out with the Air Force and with the Secretary of Defense, and if

the Secretary of Defense and the Secretary of the Air Force says that this is necessary to national security, you do not go behind that determination. Is this correct?

Mr. STAATS. I think this is substantially correct. We have, as I have indicated in my statement, given the Department of Defense until March 1961 to complete its overall review. There have been specific instances of this type as a result of special inquiries which we have gotten into directly with the Department of Defense in advance of the completion of that March 1961 report. This is one of them.

We have been into this with the Department of Defense since we received your letter specifically. The Defense Department, I think, feels very strongly that a certain part of the liquid oxygen-manufacturing capacity must be maintained for national security reasons at the site of these war-mission-located facilities.

Senator BIBLE. Of course, the burden would be on them as a matter of justification of that.

Mr. STAATS. That is right.

Senator BIBLE. I just want to try to fit you into this particular role.

Mr. STAATS. I would like to continue and say this: We would not accept at face value, to be very precise about this, any determination made by the Department of Defense; but, at the same time, for reasons which have been given in this instance I think our general policy would be to lean on the side of accepting the agency head's determination.

The other criteria which we have spelled out in this bulletin, namely, cost differential and feasibility, would be ones where we would be more inclined perhaps to take our own judgment rather than the agency's judgment. But in a situation of this kind, I think to be very fair about it, we would be inclined to accept the Department of Defense judgment. But we would want to be sure this was examined at the top levels in the Department of Defense and not just by the individual who made the initial decision.

I think the important function of this program has been to force up to the top side of the Department of Defense decisions with respect to specific cases of this kind.

I would also like to say I think specific inquiries of this type made by the committees of the Congress can also be useful because all of us, I think, are dealing here with something of a new field. We have a great deal to learn about this problem as yet. The only thing surprising to me personally is that we have not made an inventory of this kind long before this. I suppose it can only be explained in terms of the fact that so much of this got started, particularly in the Department of Defense, as a result of World War II.

A great deal of this has been brought about since World War II in the big establishments such as the Atomic Energy Commission, and so on. But a great deal of this got started in World War II and has been continued on beyond that point.

Senator BIBLE. Mr. Staats, tell me this specifically: When you received my letter of April 27, 1960, and this particular problem was pinpointed, and you knew there was some concern as to whether or not the construction of 70 liquid oxygen plants was or was not a problem of national security, how did you proceed? You assigned some

specific men on your staff to it and said, "Now, you go over to the Air Force, fellows, and have them give you the explanation." Is this how you do it? How do you review it?

Mr. STAATS. Our general policy as far as the procedure is concerned on specific matters of this kind would be to refer it to the part of the Bureau which is concerned with that agency with respect to whether or not the agency needs to continue to carry on a commercial type of activity. We have these two staff men here who have been responsible for looking at this on a governmentwide basis from the standpoint of receiving the inquiries, of keeping in touch with the central office of the Department of Defense, and in each of the agencies have designated people to work with us on this program. But it would be primarily a matter of judgment of the people who are normally concerned at the Bureau of the Budget working with the agency budget officers and with the agency people who have been designated as handling the policy for these matters.

In this case I believe it has been handled in the Office of the Assistant Secretary of Defense for Supply and Logistics, Mr. McGuire's office. He has had staff who have worked with Mr. Osborn and Mr. Wohlfeld here and with the staff of our military division in reviewing the specific situation that you outlined in your letter.

Senator BIBLE. How much time was devoted to a review of this Air Force determination or Department of Defense defense of this evaluation that this was necessary in the interests of national security, because as I understand it, that is the reason they gave for it.

Mr. STAATS. I know a great deal of time has been spent over this at the Department of Defense, from my conversation with Mr. McGuire about it. I would not know exactly in terms of classifying it in terms of man-hours or days, how much time we spent on it. Perhaps Mr. Osborn, who has been more specifically concerned with it, could indicate that.

Senator BIBLE. All I am trying to do in the development of the record is to determine how you review a determination made by the Department of Defense and the Air Force, because, as I understand it, you say that that is a fundamental decision of the agency involved when it is put on the grounds of national security. If the Air Force and Defense Departments tell you this is necessary to be constructed by Defense and Air Force because of national security, how far do you go back of that determination? Do you just take their word for it?

Mr. STAATS. Well, I don't think we would just take their word for it.

Senator BIBLE. What do you do?

Mr. STAATS. We would want to see the people who have made the decisions and talk with them and see what documents they have developed on it.

Senator BIBLE. Is that what was done in this instance?

Mr. STAATS. And be sure it was reviewed at the Office of the Secretary of Defense.

Senator BIBLE. Mr. Staats, was that done in this instance?

Mr. STAATS. I don't think that the review is entirely completed. It is in process, but I think we have been in it enough that we are satisfied generally with the nature of the decision. I don't want to put this entirely on them. I think we have—we would share in the general

view which they have taken that they will have to maintain some of this capacity at these bases.

Senator BIBLE. Who again specifically made that review? You said you did not because you had no knowledge of this prior to April 27, so it was called to your attention on April 28 or April 29. Did you participate in this review personally?

Mr. STAATS. Well, I have——

Senator BIBLE. Someone has to make this determination, and I am trying to find out who made it.

Mr. STAATS. The determination was made, I think, in the Office of the Assistant Secretary for Supply and Logistics. Whether this has been reviewed specifically by the Secretary of Defense I could not tell you. He would have to answer.

Senator BIBLE. We will let them speak for themselves, but who in your shop has specifically reviewed it and said we think or we do not think that the determination of the Air Force and Defense is a correct one.

Mr. STAATS. I think that we would have to say that the head of our Military Division is the person who is best equipped to make this kind of judgment. We have relied basically on his judgment. I have not personally seen all of the files.

I want to be very accurate about this. I have not gone into the files on it. But I would be willing to accept his judgment if he had been into them, and——

Senator BIBLE. Who is this man?

Mr. STAATS. By name?

Senator BIBLE. By name.

Mr. STAATS. His name is William Schaub.

Senator BIBLE. Is he up here today?

Mr. STAATS. No, he is not.

Senator BIBLE. As to Mr. Osborn or Mr. Wohlfeld, where do they fit in? Were they in one of these conferences to see whether this was a correct determination or not?

Mr. STAATS. Yes, I am advised that they were.

Senator BIBLE. I am not trying to confuse this issue at all. All I am trying to do is to find out how thorough a review you made of the Air Force determination, and who made it.

Mr. STAATS. I would like Mr. Osborn to speak to that because he can speak in terms of specific meetings and so on, but I would like to urge on you this general point: We would not see the Department of Defense cases ordinarily until we got their report. This report is not due in to us until March of 1961. However, in a case of this type, where you called it to our attention, or we get it called to our attention through some other channel, we will take it up and review it with the agency.

Senator BIBLE. I think it is very timely to call the report to your attention now, because if you did disagree with it you could not do very much later, because in March 1961 the Department of Defense will have already constructed 70 liquid oxygen plants. I mean, if the position of the industry is sound.

Mr. STAATS. That is right.

Senator BIBLE. If you disagreed with the Department of Defense, what would you do? Slap them on the wrist and say, "Well, you should not have done this." Is that correct?

Mr. STAATS. That is correct. That is all you can do then—curtail them as to the future.

Senator BIBLE. And say, "Don't do it again." But it would not help the people in the industry very much, would it?

Mr. STAATS. Not if they had already done it.

Senator BIBLE. If this were the end result?

Mr. STAATS. I do not know what the entire facts are, but I am advised that the Air Force will continue to procure from commercial sources even with the 70 liquid plants, more liquid oxygen than they have in the past.

Senator BIBLE. This may be true, and it may be a part of the justification when we get to it later in the course of this hearing. I am just trying to see the Budget Bureau's role in this, and see what you do. I am pretty well convinced now all you do is set a rubberstamp on this. They say it is necessary for national defense and you say, "All right. It is necessary to national defense, so we are satisfied."

Do you do anything beyond that?

Mr. STAATS. This gets down to a matter of who in the executive branch of the Government is best equipped to make that kind of investigation.

Senator BIBLE. I understand your position to be that the fundamental decision on questions of national security rests with the Department of Defense, and if they say it is a matter of national security you just rubberstamp it and say, "that is what you should do."

What I am trying to find out is, what your role is in this particular problem.

Mr. STAATS. I would not want to say we rubberstamp it. Perhaps I used that in a little different connotation than you do, but basically, as I said, on the three general criteria we have outlined we would be inclined to accept their judgment on the national defense criteria before we would accept their judgment on the other two criteria.

Senator BIBLE. I understand that, but who specifically did it? Did you say Mr. Osborn handled it personally?

Mr. STAATS. Yes. He and Mr. Schaub, I think, have been handling it.

Senator BIBLE. I think it would be helpful to have Mr. Osborn tell us exactly what he did. Perhaps this will clear up the problem.

What is your title, Mr. Osborn?

Mr. OSBORN. I am a staff member of the Bureau of the Budget.

Senator BIBLE. You had this problem called to your attention by virtue of the April 27, 1960, letter I wrote to the Director?

Mr. OSBORN. Yes.

Senator BIBLE. After this letter was received, what did you do?

Mr. OSBORN. I got in touch with both our military division and the people in the Department of Defense and asked them for their explanation of the liquid oxygen-making activities.

I also found out that this had been and has been a line item in the budget, so it is not just a part of a large figure, but is a specific item

which comes up as a matter of budgetary review in the budget-making process. I am not a part of that process, but these items are gone into quite thoroughly.

At this point we wanted to know what the thing was all about, and why the Air Force intended to install standby oxygen-making facilities at the airbases. We received a full explanation from the Air Force and from the Defense officials, and it was made very plain to us that they considered it absolutely a matter of military necessity that they have standby facilities at these bases that are assigned a war mission.

Senator BIBLE. Is this all done by telephone, or personal conference?

Mr. OSBORN. These were personal conferences; yes, sir.

Senator BIBLE. With how many individuals, and on what level in the Air Force?

Mr. OSBORN. This is at the level of quite high officials in the Office of the Secretary of Defense, the Director of Production in the Office of the Secretary of Defense, in addition to statements of the Air Force. It also became very apparent that you cannot maintain a liquid oxygen generator at a base without using it. It must be operating, at least on a part-time basis, and you must have trained personnel to operate it. Once you accept the fact that as a matter of military necessity you must have standby capability, it is just a matter of practical operation that you must operate it. You cannot just leave it in a crate and expect it to be in a performing condition when you need it.

Neither the people in our military division nor I felt that we had the capability of saying to the Air Force, "You do not need standby liquid oxygen generating capabilities at your war bases." And from there on the decision was one that just followed.

Senator BIBLE. For the record I just wanted to know the mechanics of your review, Mr. Staats.

Mr. STAATS. I think that's it.

Senator BIBLE. And I realize the justification will come from them. I think what you say very clearly is that the ultimate justification is with Air Force and Defense, and that it is going to be their burden by way of explanation later in the hearing at some point.

Senator BARTLETT. Mr. Osborn, may I ask with whom you met and whether there were any generals?

Mr. OSBORN. No, sir. I met with the officials of the Defense Department.

Senator BARTLETT. All civilians?

Mr. OSBORN. Yes, sir.

Senator BARTLETT. Did you go to them, or did they come to you?

Mr. OSBORN. In this case they came to me, sir.

Senator BARTLETT. In view of what you said about the necessity for the competent operation of the standby plants, I hope you can stay here until other testimony is developed, and I think it will demonstrate the contrary.

Mr. Staats, on page 8 of your statement you said:

> In 1,266 cases the installation was reported as being integral to the basic mission of the agency.

When that report is made, does the Bureau of the Budget accept it at face value, or does it inquire into whether this is a correct determination?

Mr. STAATS. This is listed as a part of the report which was made by the agencies. This review we are making is a continuing review. This relates to commercial-type activities which they have been carrying on regularly. We will review each of these and the whole purpose of the inventory was to get the specific before us so that they could be reviewed on a continuing basis as a part of the budget process.

It is not physically possible for the small staff we have in the Bureau to do this on an intensive basis at one time.

Senator BARTLETT. Do you have a standard to determine what may be and what may not be integral to the basic mission of a particular agency?

Mr. STAATS. It gets down again to a matter of judgment, as it does in practically all these cases, as to what represents an integral part of the mission. But if it is a mission which is remotely located, or where it is so much a part of what the personnel of the agency is called on to do, you have to take them case by case and make your judgment.

Senator BARTLETT. Then I assume that the same would be true in respect to the following statement where you said that in nearly 10,000 cases commercial sources were not available.

Obviously, the Bureau of the Budget could not go into every field site and determine whether or not that is a correct situation. You are obliged to take the word of the agency in a good many of those cases.

Mr. STAATS. That is correct. That is correct.

Senator BARTLETT. What does it mean when you say, "It is administratively impracticable to utilize commercial sources"? Obviously, the Commodity Credit situation explains itself. Would that be true in the other cases also?

Mr. STAATS. I think we could give you some further examples of that, Senator Bartlett, which might help to point this up. We would be glad to put it in the record, or perhaps Mr. Osborn could outline some of those.

Senator BARTLETT. Yes.

Mr. OSBORN. I should like to give this as one type of example of some of these items that are integral to the mission of an agency. Some of our hospitals maintain their own laundries and farms and so on, as therapeutic treatment for the patients. A large number of these items are in prisons where they have prison industries, and the prisoners are performing occupations which will be useful when they leave.

At St. Elizabeths the patients are doing a lot of things that could be considered commercial and industrial activities, but it is one method which has therapeutic value.

When these items come in we turn them over to the people in the Bureau who regularly handle that particular agency and ask them what they think of that as an activity. In the cases where the agency says commercial facilities are not available, of course, we cannot go and check on each one. We have to rely on the agencies when they say that.

Senator BARTLETT. But that is the general type of category in which these cases fall?

Mr. OSBORN. Yes.

Senator BARTLETT. Now, Mr. Staats, you have told Chairman Bible, or implied, at least, that it is difficult—and this is understandable—for you to go behind that phrase "national security." Does any other department of the Government have a comparable phrase which would prevent your proposing suggestions that you might desire to?

Mr. STAATS. The Atomic Energy Commission would be the principle one other than the Department of Defense.

Senator BARTLETT. What about the Central Intelligence Agency?

Mr. STAATS. You are speaking of the CIA. We have not asked them to report on this program. The Federal Bureau of Investigation has justified some of its activities on grounds of national security.

Senator BARTLETT. You would be much more hard-boiled with respect to the Department of Agriculture, or the Department of the Interior, or other agencies of that type, than these you mentioned?

Mr. STAATS. Do not let me mislead you here, in terms of categorizing these. We have these three criteria, but in the Department of Defense itself, or in the Atomic Energy Commission, with respect to the question of availability of commercial sources, or with respect to the practicability because of cost, we would apply the same criteria there exactly as we would in the Department of Agriculture. But it is in the category of those things directly war related, or where the mission is a war-related mission, that is where you get into the national security determination we were talking about to Senator Bible a moment ago.

Senator BARTLETT. And everything in the Department of Defense is war related in one way or another.

Mr. STAATS. It becomes a matter of degree again, and a matter of judgment.

Senator BARTLETT. Thank you. That is all.

Senator BIBLE. I wanted to clear up a further question, Mr. Staats, and maybe it is more properly directed to the general, but I ask it of you as well: I understand this item for the construction of 70 liquid oxygen plants is a line item in the 1961 budget. What is the amount of that line item?

Mr. STAATS. I am advised that not all 70 of these were in the 1961 budget. I believe this has been a budgeted item for the past few years, but I would be very happy, Senator Bible, to give you exactly when this liquid oxygen-manufacturing program was undertaken by year and the amount of money. I do not have that with me.

Senator BIBLE. If that could be furnished for the record, it would help.

Mr. STAATS. Yes.

Senator BIBLE. The thing that intrigues me and puzzles me, and the reason for my question is this: If this is a 1961 line item, then the Defense appropriation has not passed the Congress yet.

Mr. STAATS. That is right.

Senator BIBLE. Isn't this true?

Mr. STAATS. That's right.

Senator BIBLE. Why are they attempting to advertise for these plants prior to the time they have obtained the money to pay for it?

Mr. STAATS. That is what leads me to believe that some of this money is 1960 money rather than 1961.

Senator BIBLE. Will you clear this up for the record?

Mr. STAATS. Yes.

Senator BIBLE. Maybe the Department of Defense is unduly optimistic.

Mr. STAATS. I would not think they would be advertising for any items that are in the 1961 budget.

Senator BIBLE. That is what confused me, when you said this was a 1961 line item.

Mr. STAATS. I did not have the number of 70. It was not in my statement and I think it came out in the discussion here.

Senator BIBLE. The Air Force and Defense people were advised and we have to hear the industry people next, so we will hear the Defense people this afternoon and they will have ample time to dig that out later and supply it to us. Maybe it is more proper to put the question to them because they have to justify it in the Senate appropriation hearings.

Senator Chavez is holding hearings on that right now, so they will be advised of my inquiry, to which I would like to have the answer.

Mr. STAATS. If you would like to have us supply the information on this with respect to the amounts of money, and schedules, and so on, we will be very happy to do it.

Senator BIBLE. I would not want two great agencies of the Government working on the same problem. I think we can direct it to the Department of Defense rather than to you.

Mr. STAATS. Good.

Senator BIBLE. Thank you very much, Mr. Staats. I appreciate your courtesy. You are always very helpful to us. Thank you.

I anticipate we have no further questions of the Budget Bureau, so you may be excused.

Mr. STAATS. Thank you very much.

Senator BIBLE. Our next witnesses are the industry witnesses. The first one I am going to ask to come forward is a long-time friend of mine, and a distinguished legislator in my home State. I note with a great deal of interest and pride that he is now the president of the Independent Oxygen Manufacturers' Association. So I will ask Mr. Kean if he would not come forward as the first industry witness.

## STATEMENT OF T. M. KEAN, PRESIDENT, THE INDEPENDENT OXYGEN MANUFACTURERS' ASSOCIATION, AND PRESIDENT OF THE SIERRA OXYGEN CO., RENO, NEV.

Mr. KEAN. Thank you, Senator Bible.

Mr. Chairman and members of the committee, I am Tom Kean, president of Sierra Oxygen Co., Reno, Nev. At this time I am privileged to serve The Independent Oxygen Manufacturers' Association as their president.

The Independent Oxygen Manufacturers' Association, or IOMA, has 56 members within the 50 States, Puerto Rico, and Guam.

I have been engaged in the manufacture of oxygen for the past 14 years. During that period it was my privilege to serve as a consultant to the U.S. Navy. My particular task was to survey the requirements for LOX at naval bases and installations. I was then to weigh the advisability of self-production versus procurement from private industry.

Senator BIBLE. For the record, what is LOX?

Mr. KEAN. I'm sorry. Liquid oxygen. It is a military term adopted by both the Army and the Navy. Liquid oxygen.

I am pleased to say that, as a result of that survey, the Navy is buying from commercial sources wherever possible.

I should like first of all, in behalf of myself and the association, to thank this commitee and its chairman for the opportunity to air both sides of this most controversial procurement. At the same time I must state that we feel great regret at the necessity for this hearing.

As an industry, it has been our pride that we have always worked with and for the Department of Defense wherever and whenever possible.[1]

For example, in 1957, the Department of Defense determined that liquid oxygen was an essential product and that it was liable to be in short supply within the foreseeable future. It asked our industry to expand its production and offered each manufacturer in return a certificate of necessity, allowing a fast writeoff for tax purposes. Our members responded admirably, expanding their plants to meet the anticipated defense requirements.

(The following letter and list of necessity certificates were received subsequent to the hearing:)

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF CIVIL AND DEFENSE MOBILIZATION,
OFFICE OF THE DIRECTOR,
*Washington, D.C., May 23, 1960.*

Mr. W. D. AMIS,
*Select Committee on Small Business,*
*U.S. Senate, Washington, D.C.*

DEAR MR. AMIS: Pursuant to your telephone request of May 13, 1960, I am enclosing a list of necessity certificates issued for facilities to produce liquid oxygen and liquid nitrogen. You will note that 10 of the 16 certificates issued were to small business concerns.

Sincerely,

LEO A. HOEGH.

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[1] See app. IV, p. 299.

## Office of Defense Mobilization—Finance Division

(Issue No. A–305—Date of preceding issue, Aug. 20, 1957; date issued, Aug. 22, 1957)

*Journal of transactions—Report of certificates approved*

| TA No. | Date filed | Applicant | Location of facilities | Product or service | SIC No. | Delegate agency | Amount | Percent eligible for certification |
|---|---|---|---|---|---|---|---|---|
| | *1956* | | | | | | | |
| 31340 | Mar. 9 | Industrial Air Products Co. | Portland, Oreg. | Liquid oxygen and liquid nitrogen facilities. | 2896 | Chem. | $775,000 | [1] 60 |
| 31532 | May 21 | Big Three Welding Equipment Co. | Houston, Tex. | do. | 2896 | do. | 1,380,695 | [1] 60 |
| 31811 | Aug. 10 | Dye Oxygen Co. | Phoenix, Ariz. | do. | 2896 | do. | 173,000 | [1] 60 |
| | *1957* | | | | | | | |
| 32333 | Mar. 5 | Air Reduction Co., Inc. | Bassett, Calif. | do. | 2896 | do. | 2,653,250 | 60 |
| 32357 | Mar. 13 | Big Three Welding Supply Co. | Hurst, Tex. | do. | 2896 | do. | 578,500 | [1] 60 |
| 32426 | Apr. 17 | The Burdett Oxygen Co. of Cleveland, Inc. | Los Nietos, Calif. | do. | 2896 | do. | 495,330 | [1] 60 |
| 32429 | Apr. 18 | Pure Air Products Co. | Augusta, Ga. | do. | 2869 | do. | 1,195,500 | [1] 60 |
| 32450 | Apr. 25 | Sierra Oxygen Co. | Reno, Nev. | do. | 2896 | do. | 62,823 | [1] 60 |
| 32465 | Apr. 30 | Marks Oxygen Co., Inc. | Augusta, Ga. | do. | 2896 | do. | 418,234 | [1] 60 |
| 32497 | May 8 | The Liquid Carbonic Corp. | Urbana, Ohio. | do. | 2896 | do. | 1,366,000 | 60 |
| 32563 | June 6 | Southern Oxygen Co. | Greensboro, N.C. | do. | 2896 | do. | 915,081 | 60 |
| | *1956* | | | | | | | |
| 31204 | Jan. 16 | California Oxygen Co. | Sacramento, Calif. | do. | 2896 | do. | 419,600 | [1] 60 |
| 32156 | Dec. 19 | California Oxygen Co. of Los Angeles. | La Habra, Calif. | do. | 2896 | do. | 412,000 | [1] 60 |
| | *1957* | | | | | | | |
| 32390 | Apr. 1 | The New England Industries, Inc. | Fort Pierce, Fla. | do. | 2896 | do. | 4,098,844 | 60 |
| 32433 | Apr. 19 | Air Reduction Co., Inc. | South Action, Mass. | do. | 2896 | do. | 2,043,520 | 60 |
| 32529 | May 21 | The Liquid Carbonic Corp. | San Francisco, Calif. | Liquid oxygen and liquid nitrogen. | 2896 | do. | 60,000 | 60 |

[1] Small business.

Mr. KEAN. It is ironical indeed that the likely result of the proposed Air Force purchase will be to deprive the private oxygen industry of the same volume of business for which it expanded at the Defense Department's request.

Senator BIBLE. Will you please stop there for a moment for a question from Mr. Stults?

Mr. KEAN. Yes, sir.

Mr. STULTS. Just so we pin down what brought this matter to a head, Mr. Kean. This procurement is not of liquid oxygen, but it is for liquid oxygen generating facilities. Is that right?

Mr. KEAN. That is correct.

Mr. STULTS. Bids have gone out, so far as you know, to manufacturers of such equipment. Is that correct?

Mr. KEAN. That is correct.

Mr. STULTS. For how many units?

Mr. KEAN. Seventy.

Mr. STULTS. These bids were scheduled to be opened some time this month. Is that right?

Mr. KEAN. May 2.

Mr. STULTS. May 2. A call from Senator Sparkman presumably help up that opening. Is that right?

Mr. KEAN. That is what I understand.

Mr. STULTS. So the procurement is not of liquid oxygen, but of facilities for generating liquid oxygen?

Mr. KEAN. I stand corrected. You are right.

It is the contention of the Independent Oxygen Manufacturers' Association that this procurement is neither necessary to the national defense nor in the best interest of that defense; further, that it constitutes direct competition by the Air Force with private industry, such competition capable of producing disastrous effects upon the smaller members of the oxygen manufacturing industry.

It is our intention today to prove beyond doubt that the policy of the Air Force is ill advised and founded upon conditions which will not stand thorough investigation. It is our hope that this procurement will be canceled, and, further, that all production by the Air Force within the 50 United States, on Puerto Rico, and on Guam, will be brought to a complete stop, and that the Air Force itself will realize the great advantage of depending on commercial suppliers.

We believe that this is desirable because it will result in great savings for the taxpayers, and will in reality promote the national defense in every way.

We have prepared our hearing in such a manner that we may produce people from the areas to be affected. It was not possible for us to bring in people from all the 23 affected States and Puerto Rico. In some instances, it will be necessary for us to depend on those who are here to clarify for once and for all the actual situation regarding the supply of liquid oxygen and the capability of industry to supply the needs of the defense forces.

However, we believe that with witnesses from six widely separated areas, ranging from Alaska to Maryland, from California to Georgia, we will be able to give you a representative picture.

Further, we have supplemented that picture with data covering the remaining States.

Before proceeding, we should like to separate the areas of Canada, Labrador, and Newfoundland, and the six bases located therein, and the balance of that procurement. Our association has no knowledge regarding the needs of these bases, nor the ability of private industry to supply those needs.

Accordingly, we can see that it may indeed be necessary to the national defense that plants of the kind and type listed within the procurement be erected on those bases. We shall limit our efforts to the remaining 64 plants which the Air Force proposes to place in the 23 affected States and in Puerto Rico.

We should like to have it officially noted at this time that the six bases in Canada, Labrador, and Newfoundland are eliminated from all discussion from this time on.

As many of you committee members already know, the Air Force has issued, through the Defense Department and to this committee, their policy regarding "on-base liquid oxygen plants." This policy maintains among other things that the policy of "on-base liquid oxygen plants" is not a new one; that it has been in existence for a considerable period of time; and then it proceeds to relate the necessity of these plants to the defense effort, and especially as such necessity pertains to the paragraphs of the Bureau of the Budget Bulletin 60–2. The paragraphs referred to are, of course, those which are contended to allow the Air Force to enter into forms of activity which would normally be considered as competitive with private business.

At this time I should like to present to the members of the committee Mr. Robert B. Swope, president of the Southern Oxygen Co., Bladensburg, Md. Mr. Swope has been in the oxygen business for 43 years now and is looked upon by many as the "dean" of the industry. Mr. Swope will present the association's answer to the Air Force policy.

Mr. Robert B. Swope.

Senator BIBLE. We are very happy to have you join Mr. Kean here at the witness table, Mr. Swope.

## STATEMENT OF R. B. SWOPE, PRESIDENT, SOUTHERN OXYGEN CO., BLADENSBURG, MD.

Mr. SWOPE. Thank you.

Senator BIBLE. Just be seated, Mr. Swope.

Mr. SWOPE. Senator Bible and members of the committee, no consideration of liquid oxygen can proceed without some knowledge of the fundamentals. Liquid oxygen is a light-blue, transparent liquid. It is produced by the fractional distillation of purified liquid air in a plant similar to the one pictured here, at the end of the booklet you have before you. The raw material is the air around the plant. The plant itself is a rather technical operation which requires a considerable investment in dollars, and constant care in its operation. These plants range in size from production of 1 ton per day up to and including a production of 500 tons or more per day.

Liquid oxygen is needed by industry, hospitals, and by aviators for high-altitude breathing. For actual use it is almost always

changed to the gaseous form. The gas is produced by the boiling and vaporization of the liquid oxygen at −297.4° F. Today we are considering only breathing oxygen to be used by Air Force fliers in high-altitude operations, for that is the specification set down by the Air Force in this procurement.

The Air Force has issued a policy in which they state that this liquid is essential to modern military high-altitude aircraft operations. We agree with this statement. They say, secondly, in their policy, that they must build their own plants because:

> It (liquid oxygen) cannot be stored for long periods of time without constant replenishment. Our experience is that under the best of storage circumstances daily losses of one-half to 1 percent of volume occur.

We must take issue with that statement. Liquid oxygen can be stored and the amount of replenishment is not excessive. In fact, recent developments have made it possible to store liquid oxygen over any extended period of time without any appreciable loss.

The storage which you are looking at now—this is one of the exhibits attached to this document—is called plant storage. Nearly every manufacturer of liquid oxygen maintains plant storage as is shown here in this exhibit. This particular tank holds 13,500 gallons and was developed to provide storage at isolated missile sites. If you will note this tank is not only capable of providing storage, but also can be transported by air.

Mr. STULTS. Excuse me. That is in your statement, Mr. Swope?

Mr. SWOPE. That is correct.

Mr. STULTS. It is a mobile-unit storage tank?

Mr. SWOPE. That is correct.

Senator BIBLE. It is the picture you show in the back of your statement. Is that correct?

Mr. SWOPE. That is correct.

Senator BIBLE. And that holds 13,500 gallons?

Mr. SWOPE. I think that is correct with respect to that particular container.

Mr. STULTS. That 13,500—what sort of conversion factor do you have in order to get this into tons? How many days' production of this 1½-ton unit would this tank hold?

Mr. KEAN. The units the Air Force proposes to buy are a ton and a half. So, you divide a ton and a half into 13,000 gallons. That gives 40 days' production.

Mr. STULTS. So this one airplane can carry that tank in its belly, fly to a site, and have 40 days' production of a 1½-ton unit there. Is that correct?

Mr. KEAN. That is correct.

Mr. STULTS. And that would be the result of 24-hour production of a plant?

Mr. KEAN. Twenty-four-hour operation, without shutdown, of a ton-and-a-half plant.

Mr. STULTS. Thank you very much.

Senator BIBLE. I see an awful lot of Air Force men shaking their heads at this last statement, so during the noon hour get out your slide rules and check it out, because it is an engineering area and there should be no area of disagreement there. We should know exactly how long it would take for a 1½-ton plant to produce 13,500

gallons. The answer here is that it will take 40 days. If you want to reexamine that during the noon hour, maybe the Air Force will agree with you, but they are all shaking their heads at this point. They will have their day in court, and that will be this afternoon.

You may proceed, Mr. Swope.

Mr. SWOPE. The industry has devoted considerable time, effort, and money over the past few years to the development of adequate insulation and new methods of handling which would lessen and eliminate storage losses of liquid oxygen. As a result, we have the development of S. 14, as patented by the Linde Division of Union Carbide & Carbon; 26,000-gallon storage tanks using this type of insulation have a loss of 10 percent or less over a period of 1 year; 1,300-gallon tanks, using this type of insulation, show a loss of some 2 percent per month. This is by no means excessive, nor would it require constant replenishment. Such storage equipment is available.

Further, with the addition of a cryogeneration unit such as that shown here in an exhibit attached, it is possible to store over an indefinite period of time with no loss. This unit catches the gaseous vapor, liquefies it, and returns it to the tank as liquid.

The reason the industry has put in so much time on the development of storage facilities is that the cost of production within the industry is directly related to the size of the plants. As you can see on this chart, which was issued by the North American Phillips Corp. during the latter part of 1959, recondensation under their liquefaction-of-vents system in a 2-ton plant is achieved at an estimated cost of some $17.70 per ton. At the same time, recondensation of liquid oxygen in one of their 20-ton units is achieved at a cost of $7.10 per ton. This very simple illustration can be enlarged upon by saying that production in a plant of 100-ton or 500-ton capacity would materially reduce the cost of that achieved by the 20-ton plant. Production economics are ideal when a plant runs 24 hours a day, 7 days a week.

Due to daily variation in the needs of industry and other potential users, it is necessary that the plant store the product during periods prior to distribution. Accordingly, as the size of the plants has grown, research on storage has been necessary. Today it is felt by the industry that the storage problem is virtually nonexistent.

This same factor regarding cost applies to the Air Force desire to install these 1½-ton plants. They have chosen a means of securing liquid oxygen at the highest possible cost with the least degree of efficiency and ignored the ability of the industry to produce their needs at lower cost with commensurate savings to the taxpayer.

Now, fairness demands that it be admitted that wars are not fought with balance sheets. Nor are they run on a business basis. Rather, they must be run on the basis of availability and dependability. Therefore, the issue which must decide whether these plants should or should not be procured is their necessity to meet all of the factors involved.

The Air Force stated that:

*** * * under conditions of war commercial sources may either be destroyed or conditions of war will drastically curtail ability to produce and deliver. In addition, under liquid oxygen, it required specialized transport equipment (truck and rail cars) which may themselves be substantially eliminated by conditions of war.**

A glance at the map shown at the end of this presentation, which outlines the location of the bases within the original 48 States and the locations of plants and storage for the liquid oxygen industry, reveals immediately that plants are dispersed throughout the Nation; and storage facilities, likewise. No known weapon could demolish all of the plants capable of serving each of these bases at one time. Their dispersal is such that they eliminate the Air Force contention that these plants could be attack casualties and unavailable for service.

Mr. KEAN. Would you like to take a minute to observe those in the back?

Senator BIBLE. Yes. We have the exhibit before us. It is the last exhibit. If you have any comments you want to make on it, you may do so.

Mr. KEAN. I would like to be fair with regard to the maps of the individual States that follow that. It is noted, for instance, that the State of Arkansas has 600 tons per day. These maps refer to the availability of liquid oxygen in a 600-mile radius, which the industry assumes to be an easily deliverable distance. For instance, the State of California has 500 tons per day available.

Senator BIBLE. That is within what radius, did you say again?

Mr. KEAN. 600 miles. Delaware and Maryland, for example, have 1,000 tons per day available within the 600-mile radius of this particular airbase.

Senator BIBLE. Thank you.

You may proceed, Mr. Swope.

Mr. SWOPE. The location of these plants is a fortunate circumstance. It is our understanding that any early attack would first involve the destruction of airbases. Fragmentation bombs or guided missiles dropping on airports would almost immediately destroy liquid oxygen producing plants and exposed storage tanks, whereas the location of industrial storage facilities at plants or customer locations would largely remain intact. Industry transport equipment would then be available for transferring fresh supplies and even acting as mobile storage at those or reserve airstrips.

If industry is to be deprived of this potential peacetime business, that capacity in production facilities and transport equipment would not then be available except if commandeered and taken away from essential industry. Such a condition would prove a double handicap.

The Air Force has stated that:

> A high degree of purity for breathing is required. Bases must be in a position to rapidly replenish any liquid oxygen found to have deteriorated beyond usable limits. In time of war this might not be possible from commercial sources for reasons previously stated.

We claim that if it is not possible from commercial sources, it is not likely to be possible from Air Force sources. Aside from that on this matter of purity, the industry produces to a standard of 99.5 percent pure oxygen. At our plant in Bladensburg, Md., we have been working with the Navy for some time now controlling not only the factor of purity, but also the nature of impurities found within the balance. In order to achieve this, it has been necessary to install expensive instruments and to monitor carefully all production on a constant basis. We have achieved this, and serve daily. Speaking

not only for ourselves, but also for the entire industry as well, we will meet whatever standards are devised by the Air Force or any other element of the Department of Defense.

Mr. STULTS. Mr. Swope, have you looked at the invitation for bids on these up-to-70 liquid oxygen plants—the 1½-ton plants we are talking about?

Mr. SWOPE. I have not personally looked at that procurement.

Mr. STULTS. I wonder if you can give the subcommittee any idea of whether those 1½-ton plants are going to be producing liquid oxygen that is any more nearly pure than the output of commercial facilities?

Mr. SWOPE. I would say, as a matter of technical information, it would not be possible for them to deliver oxygen more pure than can be produced from a very much larger plant. In fact, I should say that, generally, small units are not capable of producing oxygen with the same purities that we find necessary for some of the Navy procurement—at least of which we have direct knowledge.

Mr. STULTS. Are airbases so situated that they are likely to have the best possible atmosphere for producing liquid oxygen?

Mr. SWOPE. If you want an answer on that, I will say definitely "No."

Mr. STULTS. So when the Air Force sends a statement to this committee and subcommittee and says a high degree of purity for breathing is required, we will agree with that; but it has no particular relevance to the procurement of the 1½-ton units. Is that correct?

Mr. SWOPE. I will give you a definite statement in connection with that, if you would like to have it.

Mr. STULTS. Yes.

Mr. SWOPE. That is, we have found within the last 2 years' time, during which the question of certain impurities in breathing oxygen for defense purposes has come up, that the methane content is quite a factor. The installation of this equipment has made it possible for us to determine the amounts of that. That equipment is not available on any airbase in the United States that we know of. Certain test equipment is, but not of the type I refer to.

We have found on certain days when the humidity is high in this particular area—and, if any of you people here are familiar with the location of our Bladensburg plant, you know we are very close to the Baltimore Freeway—on days when the automobile traffic is very heavy there during the morning and evening hours we will be able to determine within a short time that the oxygen produced in our column over there will run higher in methane. I should say in the case of an airbase, where tremendous quantities of fuel are burned, and not burned efficiently either, but burned very inefficiently, which leads to the production of methane, that quite likely you will find higher percentages of methane in the oxygen produced in that plant than you will in the case of a very highly different plant turning it out not only for the requirements of the air service, but for everybody else.

Senator BIBLE. All right. You may proceed, Mr. Swope.

Mr. SWOPE. Any air service facility is subject to the same problems of operation and supervision as a private plant. We claim that the larger, private plants are more likely to have available skilled and specialized engineering supervision than the small-field units proposed. Moreover, the human element is always a factor.

Senator BIBLE. May I ask at that point how many operators are necessary to run what you would call a larger type plant? Or, what is a larger type of plant?

Mr. SWOPE. If you are talking about simply the actual production of oxygen without the essential personnel to provide for the compression of cylinders and handling of other equipment adjacent to the column itself, I should say one or two men are all that are necessary to run a column, large or small.

Senator BIBLE. When you mention a larger type plant, what does that mean?

Mr. SWOPE. I could say anything from 10 to 15 tons, up to as high as 500 tons. In our case it is 25 tons a day.

Senator BIBLE. You say anything that produces more than 10 tons would be classed as a large plant?

Mr. SWOPE. I would say a larger plant. I wouldn't call that a large plant. No. I would say beginning at 20 to 25 tons is the usual conception of a larger plant.

Senator BIBLE. Very well. Thank you.

Mr. SWOPE. Any air service facility is subject to the same problems of operation and supervision as a private plant. We claim that the larger private plants are more likely to have available skilled and specialized engineering supervision than the small-field units proposed. Moreover, the human element is always a factor. An oxygen column requires constant control. Smaller columns usually are more unstable than large ones. Any failure in adjustment will sometimes result in the pumping of impure oxygen into a large storage tank, contaminating the entire content. When emptied, a small producing unit may require a few days or a week to refill. A large plant would do it in a matter of hours or a day.

Nor is the issue of training germane to the procurement. The Air Force says that:

> Liquid-oxygen generators are complicated mechanisms. Unless personnel are trained and available and equipment ready prior to hostilities, there will not be time to assemble and train the required crews and commence production operations.

To assume that training must be held at the area of use, must be, in fact, on-the-job training, is to deny the school system of education. Surely, since the services are unified, it would be easy for the Air Force to continue training their men at the Army's LOX plants in Fort Belvoir. Or failing a desire to do this, to set up a school of their own as desired. It is not reasonable to maintain that these men must be trained on the spot as has been inferred by the Air Force. Further, private industry now provides considerable training which can be amplified.

For the factor of deployment, as expressed by the Air Force:

> under wartime conditions, deployment of units with complete support, including liquid oxygen, will be required.

The oxygen manufacturers stipulate the necessity for the deployment of operational units. However, we of the Oxygen Manufacturers' Association are at a loss to know how this need relates to this procurement, particularly since we understand that these plants are to be permanent industrial-type plants, with specially designed buildings.

If there are foreign bases now built, where liquid-oxygen plants are or will be needed, then we have no objection to their construction at these sites. Our president has already asked the dismissal from this hearing of those bases located in Canada, Labrador, and Newfoundland. I ask now that all foreign bases be so removed and that the element of deployment be dismissed altogether.

Senator BIBLE. What I understand you to be talking about are the 64 plants proposed in the United States and Puerto Rico.

Mr. SWOPE. That is right.

There is no way that a need in Siam, Morocco, or Timbuctoo can be tied to the operation of a plant on Dover or McGuire Air Force Bases, or in any of the other States.

Speaking of Dover and McGuire Air Force Bases, our firm, Southern Oxygen Co., currently supplies both these bases with liquid oxygen. Looking at this map you can see a literal cluster of plants, including our own, ready, willing, and able to serve these bases. Within a reasonable service range—and that is very far from 600 miles in this particular case, by the way—there is more than 740 tons per day of liquid oxygen produced by these plants, available to these bases. This liquid oxygen is produced in plants ranging from 20- to 500-ton capacity. It is produced at a fraction of the cost possible to the Air Force with the 1½-ton plants they propose to build on these bases. These plants of private industry are dispersed. As private industry, their operating methods are accepted and encouraged under our form of government. It is not possible to say precisely what effect the installation of the ton and a half plants on McGuire and Dover Air Force Bases would have on the industry around those bases. It is sufficient to say that it would be deleterious to the industry to have the Air Force enter into competition with it in contravention to paragraph 2 of the Bureau of the Budget Bulletin 60–2. It is our contention that this procurement contains no element of training, combat capability, or clear unfeasibility of private industry to serve.

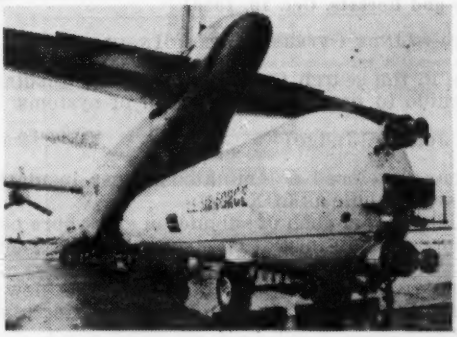
Senator BIBLE. Thank you very much, Mr. Swope. I can see why you are the dean of the industry, with 43 years in the liquid-oxygen industry.

Mr. SWOPE. Well, it was not liquid when I started. It was just vapor oxygen. I have been in the industry 43 years.

Senator BIBLE. Thank you, Mr. Swope.

Without objection, the exhibits following Mr. Swope's statement will be made a part of the record at this point.

(The documents referred to are as follows:)



# TRANSPORTING MISSILE FUEL

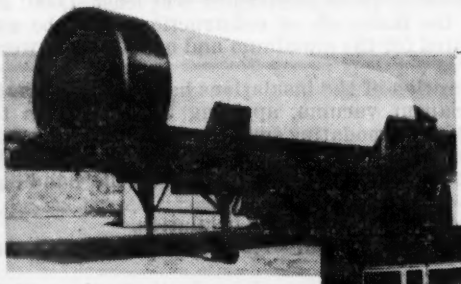
## CAMBRIDGE COMPANY

**Lowell, Massachusetts**

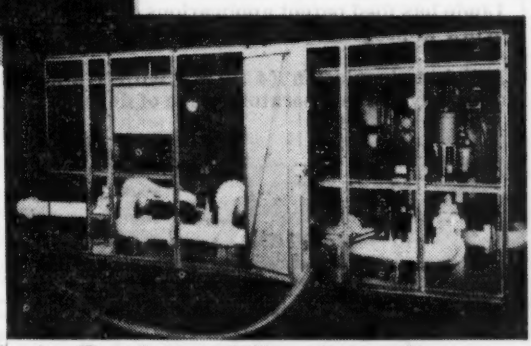
Designed and built by Cambridge for Douglas Aircraft, this airborne liquid oxygen transfer tank is used in fueling the Air Force Thor missile. The world's largest tank of its kind, this "vacuum bottle" is more than 50 feet long and 8 feet in diameter, and holds 13,500 gallons of liquid oxygen at −297.4 deg. F. FLOWLINE Stainless Steel Fittings were integral in the piping system when Cambridge initiated production of these units more than a year ago. These tanks are being built at both the Cambridge Co. division in Massachusetts and at the main Standard Steel Corporation plant in California.

### DESIGNERS AND BUILDERS OF LOW TEMPERATURE LIQUID HANDLING EQUIPMENT

Cambridge Company (Lowell, Mass.), a division of Standard Steel Corporation (Los Angeles, Calif.), produces a wide variety of equipment for the storage, transportation and distribution of liquid oxygen, nitrogen, hydrogen, helium and argon. Capacities of the products it has produced range from five liters to 28,000 gallons of liquid gas. Cambridge's complete design and development services and advanced production facilities are capable of meeting the complex engineering and fabrication problems involved in cryogenic systems.



As innovation in liquid gas transportation equipment, Cambridge was the first to supply all-aluminum, vacuum-jacketed transport trailers for liquid oxygen service. The same high quality of workmanship and materials that go into the missiles themselves are required for missile fueling equipment such as this. Only welded construction provides the safe, leakproof tanks and piping that are needed.



Ground support equipment for the Air Force Atlas missile. Built by Cambridge for Convair, this high capacity pumping unit is used for both fuel and liquid oxygen. These pumping complexes each consist of two 500 gpm pumps in parallel to arrive at a total pumping capacity of 1000 gpm for each fuel and oxygen unit. FLOWLINE Fittings are an important part of this unit.

Wallace Process Piping Company, Inc., has done the stainless piping on 30 of the many launching sites for the ATLAS Inter-Continental Ballistic Missile. This company, which has offices in Norfolk, Va., Denver, Colo., and Van Nuys, Calif., is one of the country's largest mechanical contractors. It has also installed the stainless piping on many BOMARC launching sites and TITAN testing facilities.
Mr. Sam Wallace, the company's president, states:

"Due to the care exercised in manufacture, resulting in superior fittings, we find we can save money by specifying and using genuine FLOWLINE Fittings on missile base work as well as on commercial piping." This certainly is convincing evidence that the plus values of FLOWLINE Fittings—time-proved in the process industries and in nuclear power installations—are key factors in selecting fittings for the stainless piping of the space age.

[From Missiles and Rockets, Oct. 19, 1959]

ASTRONAUTICS ENGINEERING—LINDE OFFERS "SUPER" INSULATION

Here's a report on a new advance in the search for better cryogenic insulating materials, together with a guide to practical comparison of systems

(By John F. Judge)

WASHINGTON.—The Linde Co. has developed a laminated "super insulation" which makes liquid hydrogen as easy to handle as LOX.

The material consists of 40 to 80 layers per inch of submicron glass-fibre paper and aluminum foil under absolute pressure, in insulating space, of 1.0 microns of mercury or less.

When incorporated into the popular 26,000-gallon storage tank, the new insulation, designated SI–4, makes it possible to store liquid hydrogen for a year with less than 10 percent content loss.

The development is the latest advance in the search for better cryogenic insulation to meet the changing demands of the missile/space industry.

SI–4 has a thermal conductivity of $0.025 \times 10^{-3}$ BTU/hr-ft-F° (commonly known as the k factor) between 80° F and −297° F with a density of 4.7 lbs./ft$^3$.

Another laminate, SI–12, is lighter (2.5 lb/ft$^3$). But its k factor is $0.11 \times 10^{-3}$ BTU/hr-ft-F° between 80° F. and −297° F.

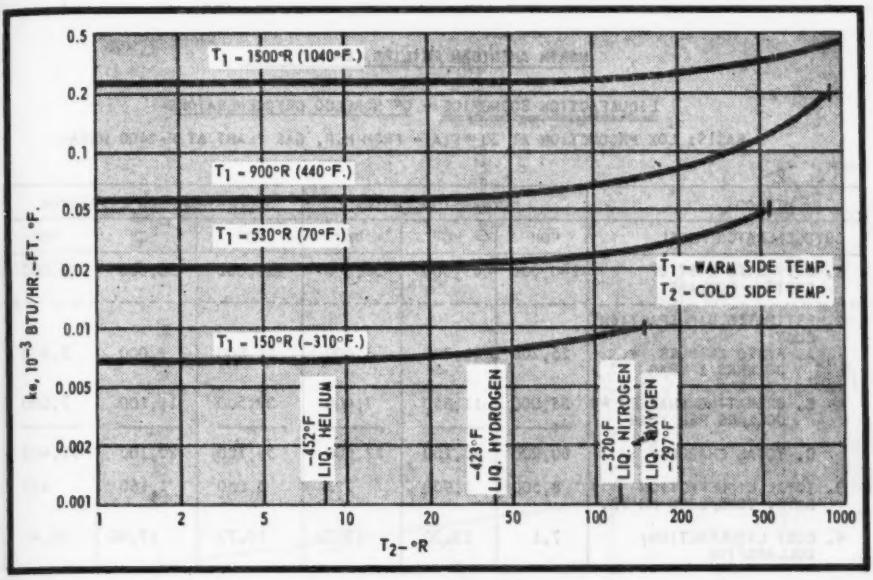
Linde believes the upper operable limit of these insulations is at least 1,000° F. This ceiling, largely determined by the materials of construction, could be extended if stainless steel were substituted for the aluminum and quartz fibers were used in place of the glass.

The practical problems in the application of the insulations have been resolved. These included maintaining a permanent vacuum, applying the insulation to geometrically irregular contours, and accommodating supports and piping through the insulation. The systems remain vacuum tight without reevacuation indefinitely under the conditions of shock and vibration encountered in the handling and transporting of the vessels.

Linde has filed patent applications covering this type of insulation.

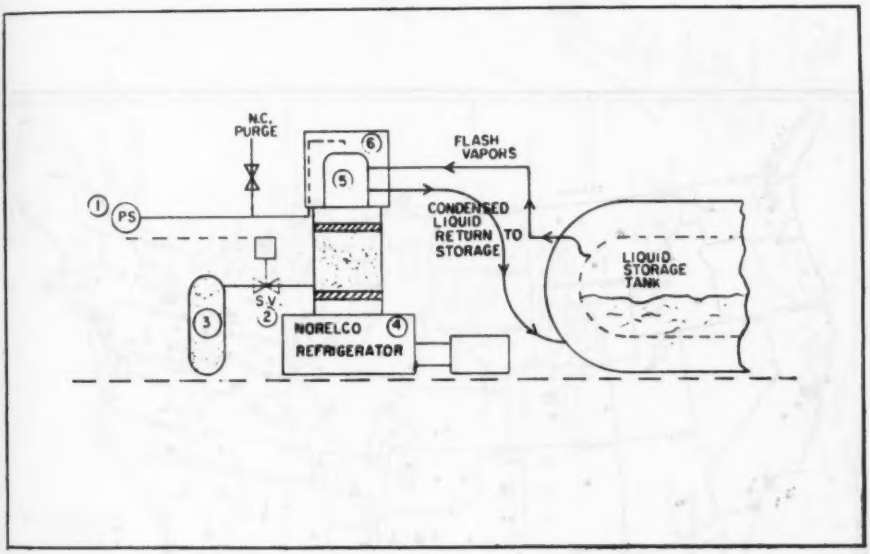
Work is progressing on a laminate roughly equivalent to SI–4 but with the cost cut in half.

A lighter insulation (4 lb/ft$^3$) with a lower thermal conductivity than SI–4 is currently in the laboratory stage of development.




**PERFORMANCE OF SI-4 at various boundary temperatures.**

28




SLIDE 8 FIG. 4

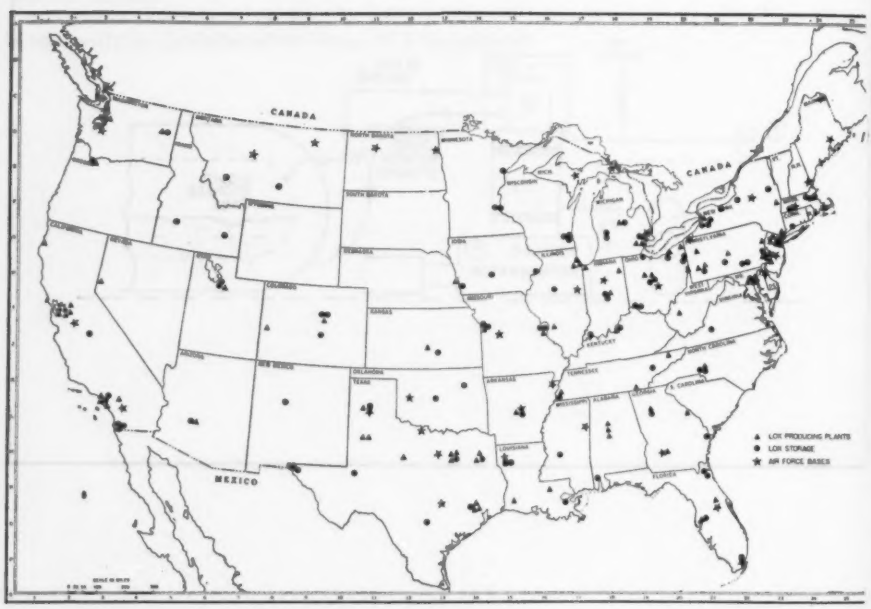
NORTH AMERICAN PHILIPS COMPANY, INC.

LIQUEFACTION ECONOMICS - OF NORELCO CRYOGENERATORS

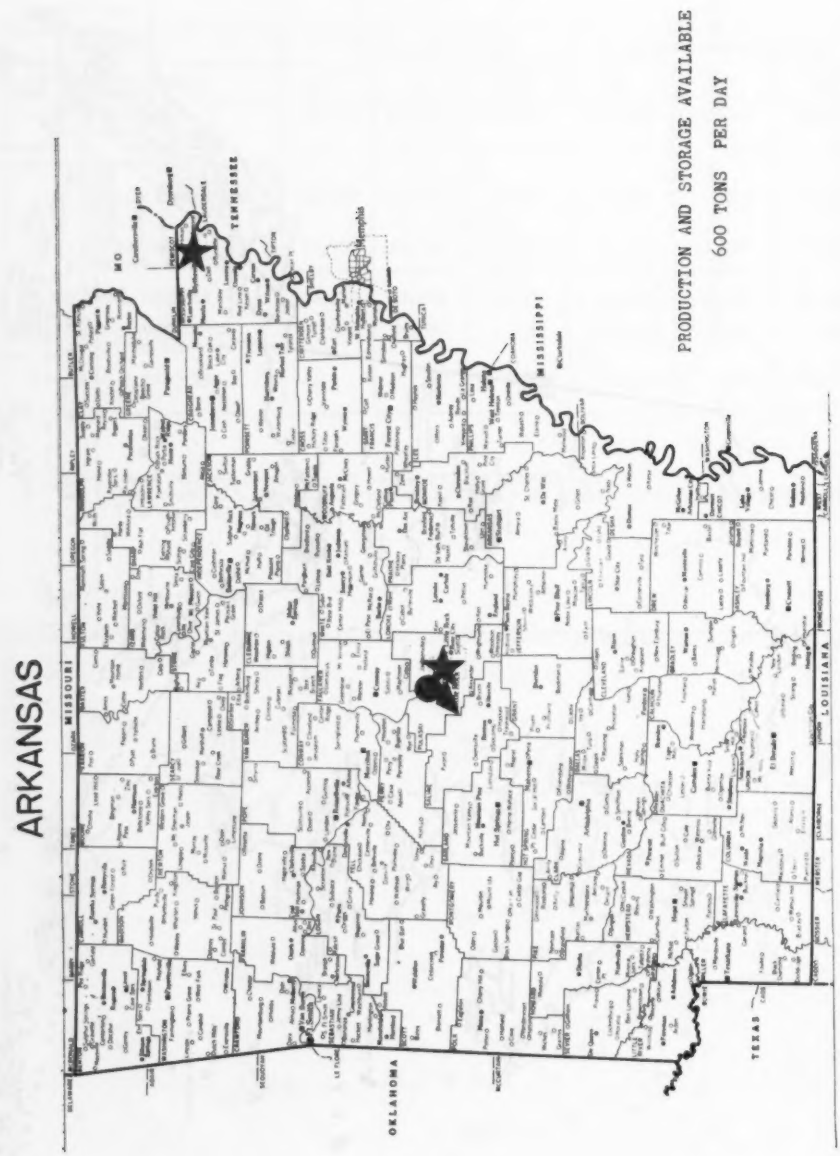
BASIS: LOX PRODUCTION AT 30 PSIA - FROM H.P. GAS PLANT AT P=2400 PSIA

| METHOD | EXPANSION ENGINE | | | JOULE-THOMPSON EXPANSION | | |
|---|---|---|---|---|---|---|
| CRYOGENERATOR MODEL | "D" | "C" | "B" | "D" | "C" | "B" |
| 1. ESTIMATED COST OF SYSTEM; DOLLARS | 140,000 | 65,000 | 30,000 | 120,000 | 50,000 | 30,000 |
| 2. ESTIMATED LIQUEFACTION COST; | | | | | | |
| A. FIXED CHARGES * DOLLARS 1 YEAR | 25,200 | 11,700 | 5,400 | 21,600 | 9,000 | 5,400 |
| B. OPERATING CHARGES ** DOLLARS PER YEAR | 35,000 | 11,550 | 7,400 | 32,500 | 11,100 | 7,000 |
| C. TOTAL CHARGES | 60,200 | 23,250 | 12,800 | 54,100 | 20,100 | 12,400 |
| 3. TOTAL LIQUEFACTION RATE: TONS/8000 HR YR. | 8,500 | 1,900 | 725 | 5,050 | 1,160 | 425 |
| 4. COST LIQUEFACTION; DOLLARS/TON | 7.1 | 12.30 | 17.70 | 10.75 | 17.40 | 29.4 |

* BASIS 10 YEARS AMORTIZATION; 3% INTEREST; 5% MAINTENANCE.
** TWO (2) MAN-HOURS/8 HOUR SHIFT; ONE (1) CENT/KW HR POWER. CHEMICALS AND WATER-@$1.00 1 TON LIQUEFACTION

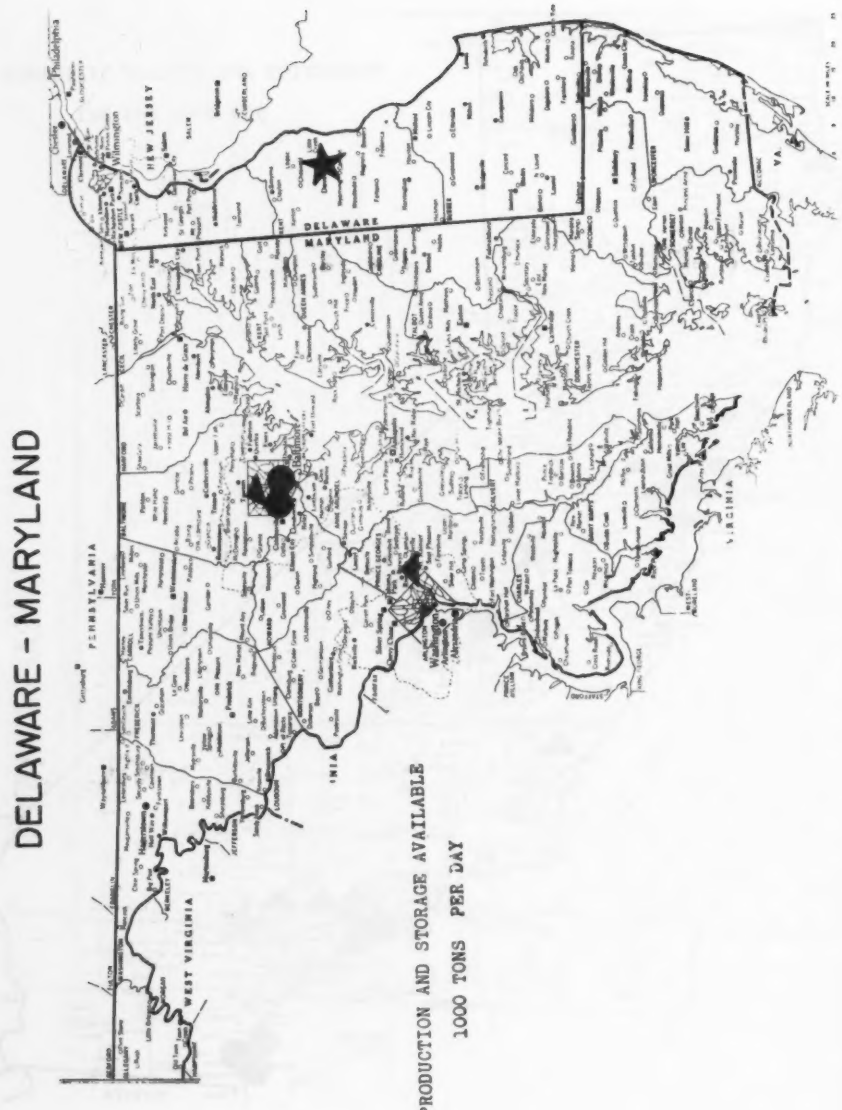


ALASKA
PRODUCTION AND STORAGE AVAILABLE
4 1/2 TONS PER DAY
YUKON
ALASKA
Bering Sea
Pacific Ocean
ALEUTIAN ISLANDS
ALEXANDER ARCHIPELAGO
PRIBILOF ISLANDS


ARKANSAS
PRODUCTION AND STORAGE AVAILABLE
600 TONS PER DAY
MISSOURI
TENNESSEE
MISSISSIPPI
LOUISIANA
OKLAHOMA
TEXAS

# CALIFORNIA

OREGON
NEVADA
ARIZ.
MEXICO
San Francisco
Los A
PRODUCTION AND STORAGE AVAILABLE
500 TONS PER DAY

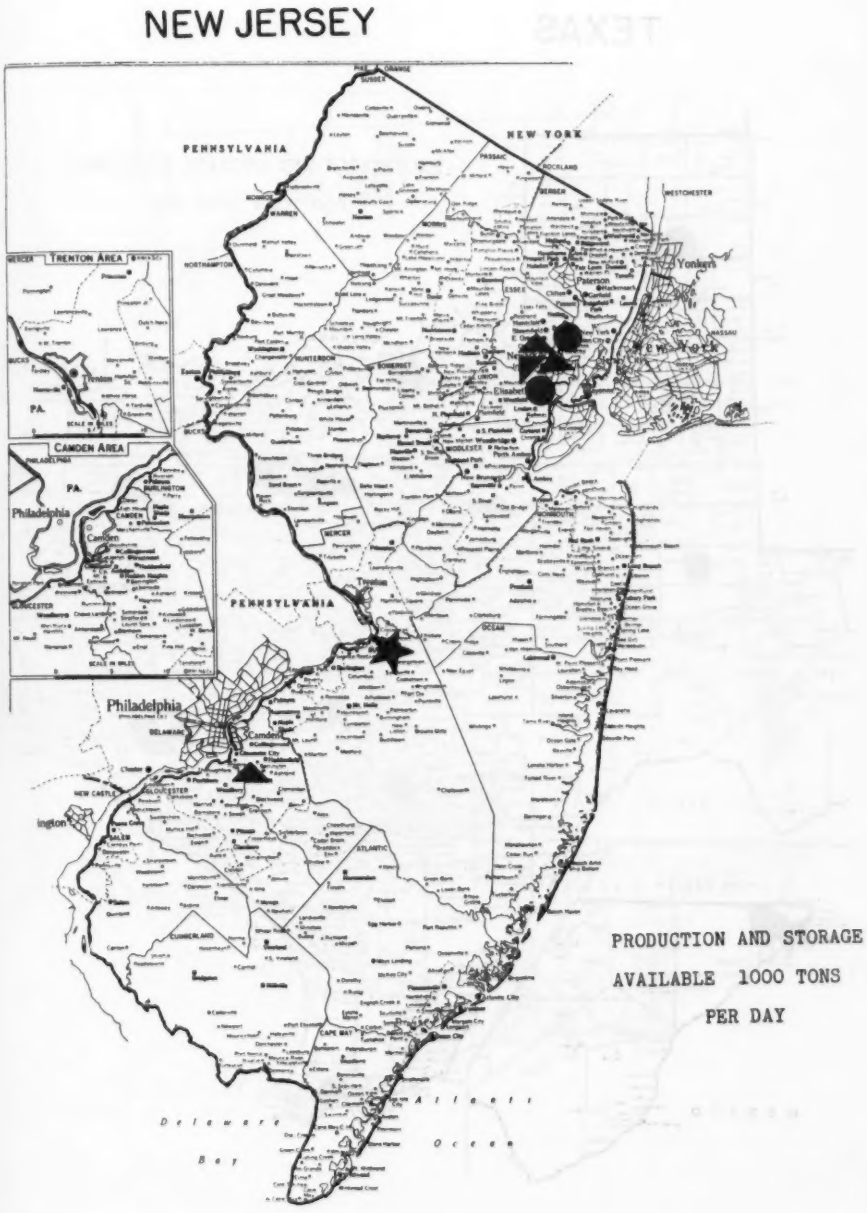

DELAWARE - MARYLAND
PRODUCTION AND STORAGE AVAILABLE
1000 TONS PER DAY
DELAWARE
MARYLAND
NEW JERSEY
PENNSYLVANIA
WEST VIRGINIA
VIRGINIA

# GEORGIA

PRODUCTION AND STORAGE

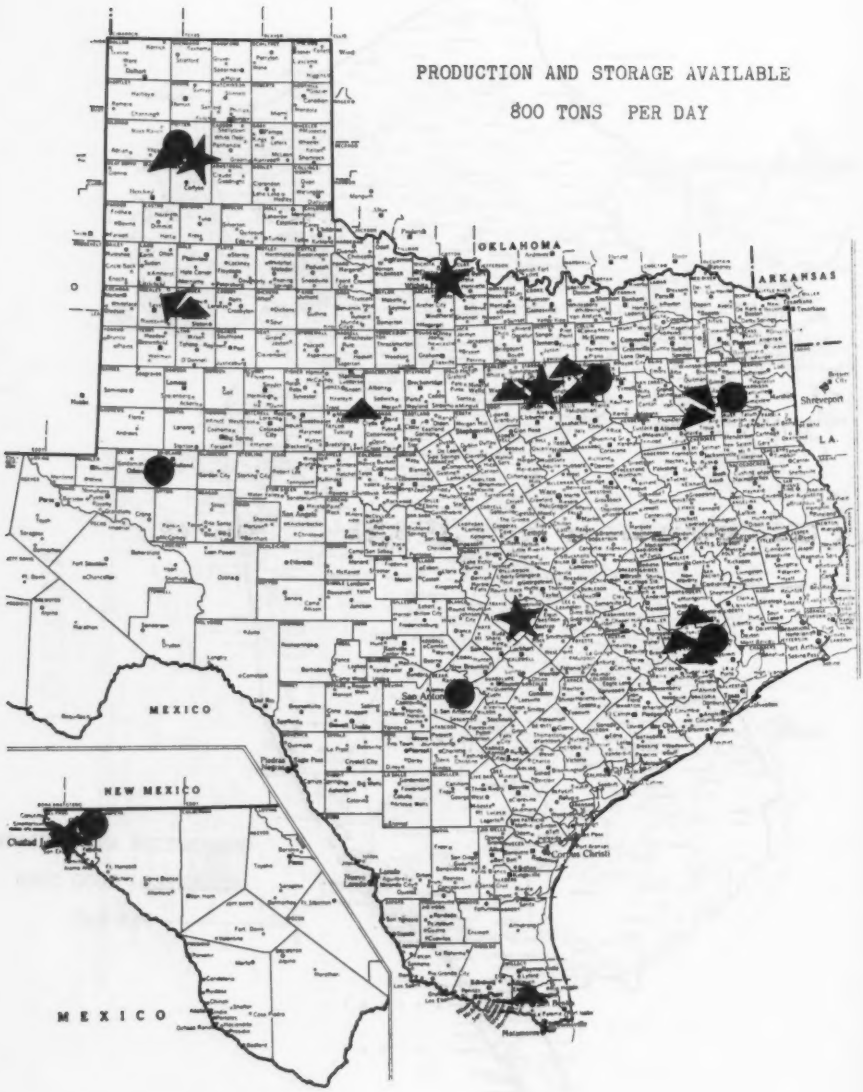
AVAILABLE 500 TONS PER DAY

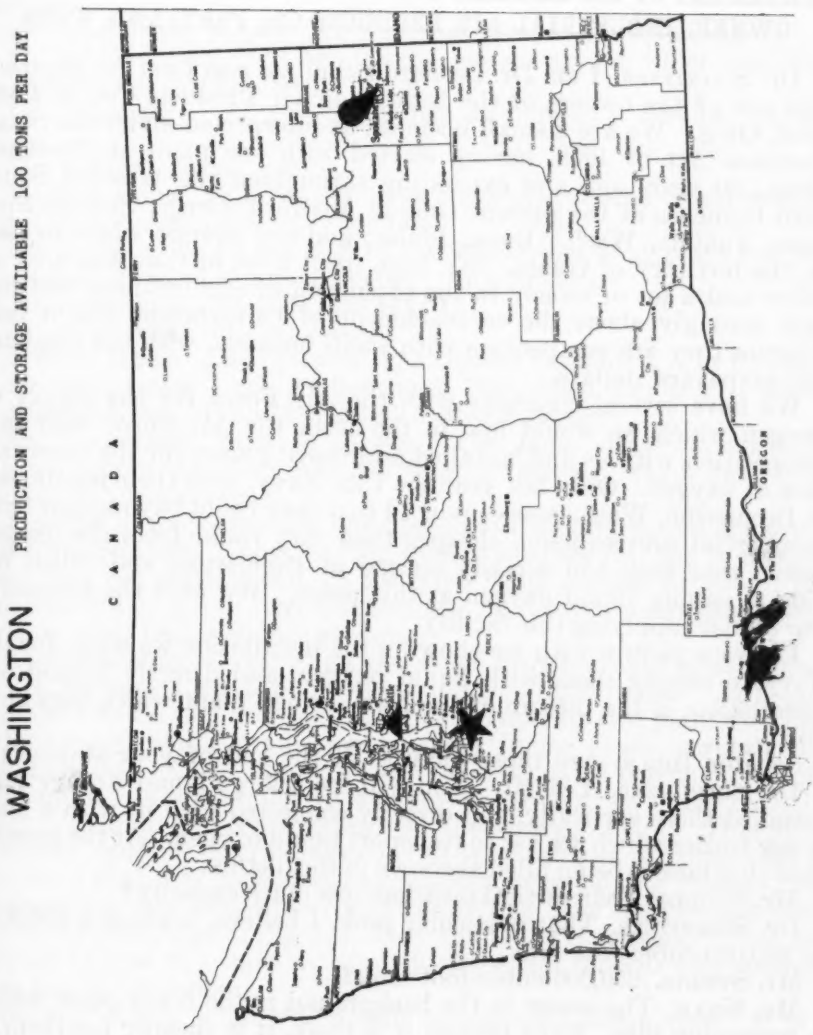
LOUISIANA
PRODUCTION AND STORAGE AVAILABLE
600 TONS PER DAY
TEXAS


NEW JERSEY
PENNSYLVANIA
NEW YORK
TRENTON AREA
CAMDEN AREA
Philadelphia
Camden
Trenton
Elizabeth
Yonkers
New York
Delaware Bay
Atlantic Ocean
PRODUCTION AND STORAGE
AVAILABLE 1000 TONS
PER DAY

55828—60——4

# TEXAS


PRODUCTION AND STORAGE AVAILABLE
800 TONS PER DAY
OKLAHOMA
ARKANSAS
Shreveport
LA.
MEXICO
NEW MEXICO
MEXICO


WASHINGTON
PRODUCTION AND STORAGE AVAILABLE 100 TONS PER DAY
CANADA
OREGON

Senator BIBLE. You may call your next witness, Mr. Kean.

Mr. KEAN. The next witness we have to appear before the committee is Dr. Leonard Schnitzer of the Industrial Air Products Co., of Portland, Oreg. He also has a plant in Guam and scattered facilities throughout Oregon and Washington State.

Senator BIBLE. Yes, Dr. Schnitzer.

## STATEMENT OF DR. LEONARD SCHNITZER, SECRETARY AND PART OWNER, INDUSTRIAL AIR PRODUCTS CO., PORTLAND, OREG.

Dr. SCHNITZER. I am Dr. Leonard Schnitzer and I am the secretary and one of the owners of the Industrial Air Products Co., of Portland, Oreg. We are a small business, as interpreted under the Small Business Act of 1958, having started with one plant at Portland, Oreg., 20 years ago and expanding throughout the Western States with branches at the present time in Medford, Oreg.; Seattle, Spokane, Yakima, Wash.; Boise, Idaho; and one oversea plant located on the territory of Guam. We have spent a lot of time and a lot of effort and a lot of money in the expansion of our business, and feel very strongly about the encroachment of Government into a field wherein they are competitive with small business, with the resultant lost taxpayers' dollars.

We have several contracts with the Air Force for the supply of oxygen which we would lose in the event the Air Force went into competition with us and installed additional plants for the manufacture of oxygen. Only last year the U.S. Navy, with their repair base at Bremerton, Wash., was convinced that they could buy oxygen from commercial sources much cheaper than they could from the oxygen plants that they had already erected at Bremerton, and called for bids to supply liquid oxygen at this point. We were the successful low bidder supplying this facility.

I have a picture with me showing the installation we made for the Navy to supply them with liquid oxygen, and directly behind our installation, is the picture of the Navy-owned plant which they shut down.

Senator BIBLE. Are those pictures at the end of your statement?

Dr. SCHNITZER. Yes, sir. You will see a large liquid storage tank installed there vertically, and directly connected with it, with a hose, is our trailer which we use to transport liquid oxygen. At the present time that tank is being filled as shown in the picture.

Mr. STULTS. That vertical tank has how much capacity?

Dr. SCHNITZER. That particular tank, I believe, is about a 200,000- or 250,000-cubic-foot tank.

Mr. STULTS. 250,000-cubic-foot tank?

Mr. KEAN. The tower in the background is the Navy plant which is remaining idle. Even though it is there, it is cheaper for them to shut it down and buy commercially.

Mr. STULTS. What kind of loss do you have in that storage tank?

Dr. SCHNITZER. Normally it will run about 2 percent per month.

Mr. STULTS. Two percent per month?

Dr. SCHNITZER. That is correct.

Mr. STULTS. They draw from there for their industrial use at Bremerton?

Dr. SCHNITZER. That is correct. They fill their own cylinders and have pipelines running throughout the plant, and all it requires is for them to push a button. The entire installation is automatic.

Mr. STULTS. And you can replenish the supply as they draw it out periodically?

Dr. SCHNITZER. That is correct. As they draw it out.

Mr. STULTS. Are there any more impurities that way? Is it dangerous?

Dr. SCHNITZER. No, sir. It never has been, to our knowledge.

Mr. STULTS. Could you breathe the gaseous oxygen which would be boiled off from this liquid?

Dr. SCHNITZER. Oh, yes. It is just as pure as it possibly can be made.

Mr. STULTS. Thank you.

Senator BIBLE. How long did the Navy operate the liquid oxygen plant at Bremerton as a Navy facility?

Dr. SCHNITZER. To the best of my knowledge, that plant was installed before the war, and it has been run ever since.

Senator BIBLE. Before World War II?

Dr. SCHNITZER. That is correct.

Senator BIBLE. And operated on a regular basis for 4, 5, or 6 years?

Dr. SCHNITZER. Yes. At least until 1959, when they shut it down.

Senator BIBLE. Then 13 years is a better statement.

Dr. SCHNITZER. That is correct. The same situation exists in Hawaii where the Navy had plants since prewar, which have been shut down for some time.

It seems incongruous that one branch of the Government is closing down their oxygen plants, having found that they can buy it cheaper than they can make it and, on the other hand, another branch of the Government is going into the business in further competition with private small business, such as ours.

Approximately 5 years ago the same situation existed at Guam, where we have a small plant supplying this little island. At Guam the Navy had a small oxygen plant, but to operate this plant they had a lieutenant, senior grade, a lieutenant, junior grade, several noncommissioned officers, approximately 10 or 12 naval personnel, and 48 Philippine civilian employees working under contract in the reconditioning plant and in conjunction with their oxygen plant. This plant was only running several days out of the month and demonstrated to the Navy that they could buy oxygen cheaper by buying from us, and at that time they closed their plant down and have since bought commercially at savings to the U.S. Navy and to the taxpayers. They are buying oxygen at a third to a fourth of the cost of their own production in their own plant.

Senator BIBLE. That bell sounds suspiciously like a vote. It is a vote. With that in mind, I think what we might do is this: It is a quarter to 12 and I could not be back from the vote until a quarter after 12, so suppose we stand in recess until 2 o'clock. I am sorry we are going to have these interruptions, but that is the way of this legislative process.

(Whereupon, at 11:45 a.m., the subcommittee recessed until 2 p.m. of the same day.)

AFTERNOON SESSION

Senator BIBLE. The hearing will come to order. We will resume with Dr. Schnitzer. We have not finished your testimony. Will you proceed and we will pick up your testimony where we left off before the noon recess.

## STATEMENT OF DR. LEONARD SCHNITZER—Resumed

Dr. SCHNITZER. I believe I was in the middle of page 2 of my statement, sir.

Senator BIBLE. Yes, you are in the middle of page 2, Doctor. You may proceed.

Dr. SCHNITZER. Similarly, at about the same time we commenced to supply the U.S. Air Force with their need for vapor gases at Anderson Air Force Base on Guam, but within a very short time thereafter they converted over to the use of liquid oxygen and brought in their own liquid generators. We have had a chance to observe firsthand the operation of this small production unit, and we have determined from our own experience in observation that the cost to the Government for this production is way out of line, compared with commercial costs.

In order to maintain their requirement of several thousand gallons of liquid oxygen a month for operational purposes, the Air Force has had at all times from two to six oxygen plants standing by at Anderson Air Force Base. At all times they have had one or two plants that were in reserve for standby, and usually one or two plants worn out and ready to go home. We are able to sell the Air Force a couple of hundred gallons of liquid oxygen a month when they are broken down. This is the only liquid oxygen that they purchase from us at Guam. We could sell them liquid oxygen at this point for about a third of what it cost them to make it. We have standard heavy-duty commercial equipment and trained personnel.

I feel that their personnel can be used to better advantage than to engage in direct competition with private business such as ours. In Guam we are the largest industrial consumer of electric power with our small liquid oxygen plant, and the 10 or 12 people we have employed in our oxygen plant could very well handle additional Air Force business without any disruption in our capacity. There are only several small industries there.

I believe that wherever possible the U.S. Government should purchase oxygen from commercial sources. If we lost all of the military business which we have at Guam we would be forced to close down our plant, and the civilians, hospitals, doctors, and other users of gases on Guam and surrounding islands would be forced to bring them in from Japan or from the States at a tremendous expense. A similiar situation exists in Hawaii, as well as other places.

Senator BIBLE. How large is your Guam operation?

Dr. SCHNITZER. In what respect?

Senator BIBLE. Your plant operation.

Dr. SCHNITZER. Our plant is about a 2-ton plant.

Senator BIBLE. How many people do you employ there?

Dr. SCHNITZER. We employ in the oxygen plan itself about three or four operators. We have other personnel in the cylinder maintenance department, and also the carbon dioxide plant and the acetylene plant, and their whole personnel are interchanged. The whole gas operation has about 14 or 15 men.

Senator BIBLE. You are talking about a 14- or 15-man operation in Guam?

Dr. SCHNITZER. Right. But that is running three different types of plants.

Senator BIBLE. I understand that.

Dr. SCHNITZER. Some time ago the U.S. Government, in order to encourage new liquid oxygen production, issued certificates of necessity to encourage oxygen manufacturers to expand their plants. We did this in our Portland plant with the expectation that we would receive Air Force and other liquid oxygen business.

We were low bidders for 1960 at McChord Air Force Base to supply 77,000 gallons at a total delivered price of $38,500. The Air Force now wishes to put in two plants at an estimated installed expense of $200,000 to duplicate our service.

I believe that Air Force policy should be refined and worked out in conjunction with private manufacturers so that they are not directly competitive in the same places. I see no objection to the Air Force producing liquid oxygen in remote areas where it is not commercially produced, but, when they try to compete elsewhere, it is pure waste.

Senator BIBLE. Thank you very much, Dr. Schnitzer. I have no questions.

Mr. STULTS. No questions.

Mr. MESSICK. No questions.

Senator BIBLE. Thank you very much. Without objection the photograph attached to Dr. Schnitzer's statement will be submitted for the committee files, since it is one that would be difficult to reproduce successfully in the printed record. You may call your next witness.

Mr. KEAN. Our next witness is William Josephian, from California, who has a liquid oxygen plant at Oakland. William Josephian.

Senator BIBLE. We are glad to have you with us, Mr. Josephian. You may proceed.

## STATEMENT OF WILLIAM JOSEPHIAN, PRESIDENT, PACIFIC OXYGEN CO., OAKLAND, CALIF.

Mr. JOSEPHIAN. My name is William Josephian. I am the owner and president of Pacific Oxygen Co., of Oakland, Calif. I have been in the oxygen business at this stand for 23 years, starting out with a plant capable of producing 600 cubic feet of oxygen per hour, and, over the period of years, increasing this to its present capacity of approximately 20,000 cubic feet per hour.

My present plant produces liquid oxygen, which I am capable of supplying to the Air Force in quantity. I was successful bidder on the breathing oxygen requirements for seven bases in my area, two of which have their own plants and one of which, Castle Air Force Base,

is the proposed location of three of the plants under consideration in this hearing.

My plant capacity of 20,000 cubic feet per hour amounts to approximately 170 gallons per hour, or 4,000 gallons per day, which, in turn, is equal to the productive capacity of about 12 of the proposed 1½-ton plants. Of my total capacity, approximately 1,500 gallons per day are available for supply to the armed services. My quoted price to the Air Force on liquid oxygen, delivered to all bases except one, is 33 cents per gallon. The exception is 38 cents for delivery to Nellis Air Force Base, Nev., which is some 600 miles from my plant.

Having learned of the Air Force request for proposals, RFP–40–604–60–5386, I was interested in determining why the Air Force would want to put plants in my area of operation, when they could be purchasing from me, or from one of my competitors at what seemed to me to be a very low price. Accordingly, I tried to compute on a conservative basis the cost of the Air Force buying from private industry versus the cost of buying its own plants and producing for itself.

I obtained from Benton's Reporting Service the record of the Air Force's request for bids at 27 of the bases proposed as locations for the 1½-ton plants. Forty-six of these plants were scheduled by the Air Force for location at these 27 bases. The Benton report shows the quantity of oxygen on which the Air Force requested bids at each base, and the lowest bid from private industry in each case. The estimated gallonage requirement is multiplied by this low bid per gallon and extended to show the total dollar cost to each base.

The total oxygen requirements bid on at these 27 bases amounted to 987,650 gallons, and the total dollar amount of the bids was $510,531. This sum represents cost to the Air Force delivered at its bases. The overall average cost is 51.5 cents per gallon.

I made the following assumptions to determine as close as I could the direct cost to the Air Force of purchasing its own plants and producing this same quantity of oxygen in such plants—

1. That the cost per plant would be not less than $100,000, installed, housed, and made operational.

2. That life expectancy of each plant would be 10 years as set forth in the Air Force specifications.

3. That a minimum annual cost of parts for maintaining each plant in operating condition would be 5 percent of its cost, or $5,000 per year, based on 6,720 hours' operation per year. (This last is the figure used in the Air Force specifications which state 506 hours per month. This, in turn, amounts to approximately 75 cents per operating hour per unit based on the 6,720-hour rated operating year.)

4. That the total number of hours of operation required to produce the 987,650 gallons was 77,600 hours. (This figure was arrived at by dividing the bid request for each base by the plant capacity of 14 gallons per hour adding the hours so computed to get the total required for all bases, 70,546 hours, and adding 10 percent, or 7,054 hours, representing a very conservative estimate of time lost during startup, shutdown, and minor servicing only.)

5. That not less than two men would be required to operate each plant, and that the cost for each man would not be less than $2 per hour—considerably less than what I pay my men.

6. That the cost of power to operate the plants would be not less than $1.25 per hour. (This is based on a cost for electricity of 1 cent per kilowatt-hour, and based on the Air Force specifications which require that 1 kilowatt-hour produce 1 pound of oxygen, and that each plant produce 125 pounds per hour. The 1-cent per kilowatt-hour figure used represents the approximate minimum cost to private industry for such electricity.)

Using the above assumptions, which in all instances are believed to be conservatively low as to cost and generously high as to the efficiency of the operator, the following cost of operation to the Air Force results:

| | |
|---|---|
| Power (77,600 hours at $1.25 per hour) | $97,000 |
| Labor (77,600 hours for 2 men at $2 per hour) | 310,400 |
| Maintenance parts cost (77,600 hours at 75 cents per hour) | 58,200 |
| Total operating cost | 465,600 |
| Amortization of cost of plants (10 percent—times 46 plants at $100,000) | 460,000 |
| Total direct cost | 925,600 |

This $925,600 compares with the $510,531 private industry bid on a delivered basis. It is considered to be the most favorable possible cost basis on which the Air Force could operate. No cost has been attributed to supervision nor to standby time which would necessarily occur here, since the plants would not be operated at rated capacity. For instance, if operating crews were supplied to each plant for 560 hours per month's operation, the 77,600 hour annual figure used would be increased to 309,120 hours.

I well realize that the figures given above are not large when viewed against the total sums spent on national defense; however, it seems obvious to me that if this type of unnecessary burden on the American taxpayer is multiplied by many other such instances, the burden will become unbearable.

Senator BIBLE. Thank you very much, Mr. Josephian. You say in effect—I do not know whether your assumptions or the final calculations are correct, but assuming they are—you are saying you could do it for about half of what it would cost the Air Force?

Mr. JOSEPHIAN. Yes, sir.

Senator BIBLE. We will have our staff experts go through this. We will not try to do this right now. I get your point.

Mr. JOSEPHIAN. Thank you very much.

Senator BIBLE. You may call your next witness.

Mr. KEAN. Our next witness is Cy Rickel from Texas. He has quite a large operation, and again he is assumed to be one of the deans of the industry.

Senator BIBLE. Mr. Rickel.

## STATEMENT OF C. K. RICKEL, PRESIDENT, BIG THREE WELDING SUPPLY CO., FORT WORTH, TEX.

Mr. RICKEL. I am C. K. Rickel, president of the Big Three Welding Supply, of Fort Worth, Tex. Our firm serves an area which

reaches from Albuquerque, N. Mex., to Shreveport, La., and from Enid, Okla., to El Paso, Tex., and points in between. With one exception, we serve all of the Air Force bases within this area, including five bases which are listed on this procurement.

Ever since liquid oxygen became essential to the operation of SAC planes, we have witnessed the attempt of the Air Force to produce their own liquid oxygen through the small, portable plants which are now located on most of these bases. With the exception of Barksdale Air Force Base, the remainder have found it a definitely unreliable method of production and, as a result, have produced spasmodically in accord with the whim of their particular plant or plants. It is especially significant that Barksdale, for which we hold a service contract at this time, has bought little or no liquid oxygen since the first of the year.

It is not possible to accept the statement of the Air Force that these plants are not in competition with private business. Our past experience with the smaller plants has proven beyond doubt that they do compete. The installation of these new permanent, commercial-type plants would undoubtedly remove the supply of these bases from the service of private industry altogether. As planned, they will definitely compete and will provide totally unnecessary competition.

The contention that these plants can and will be deployable is entirely unrealistic. The plants for which bids are requested are essentially of a permanent, commercial-type installation housed in permanent buildings.

The industry in Texas and throughout the Nation is capable of supplying the Air Force with all of its needs. The loss of this market to private industry would have an effect that would be felt for some time to come by the industry itself, but it is our contention that in the long run the Air Force would feel it even more.

Industry gears and produces to serve a prescribed market. Production is limited by the size of the market, increasing to meet greater demands, and diminishing as those demands recede. Only recently the Air Force notified us that they were writing new specifications for breathing oxygen which would require a considerable outlay for instrumentation to be certain that production met these specifications. This is not necessary for any other segment of our business. Accordingly, withdraw the Air Force portion, and we have no need for such instrumentation. In short, we will not gear our production to serve them at all.

Withdraw the Air Force requirements, and we produce to serve private industry. Therefore, the Air Force loses a stable reserve, as well as a source of supply, for instrumentation to meet their specifications cannot be installed and checked overnight. They then are an even greater loser than we are.

The entire matter seems absurd when it is realized first that industry is fully capable of serving all of the Air Force needs; and second, the installation of adequate storage upon these same bases would offer greater combat capability, and at the same time remove completely any requirement for plant production by the Air Force itself.

Finally, if the Air Force would meet with the members of the liquid oxygen industry and take advantage of the knowledge that is available at their request, they could coordinate this industry with their

needs, and in so doing achieve a unified effort by all in the Nation's defense.

Senator BIBLE. That last statement is rather significant. I have been prompted to ask several of the witnesses Mr. Kean has presented as to whether or not the Air Force actually has, as a matter of practice, called industry people in to discuss this very problem you are airing before a congressional committee today. Have they called you in to give your side of the story?

Mr. RICKEL. At the local level, Senator Bible, we have been called on by local people at Carswell Air Force Base at Fort Worth to help them on some of their problems. The people who are particularly interested are the people making airplanes like Convair and Chance-Vought, and those people. We are constantly in their plants and giving them help and giving them advice which they tell us is very valuable.

We would be happy to do that with the Air Force at any time they have trouble at any installation. We think that we have—I won't say the smartest personnel, but about as smart as anybody and we are very happy to give out our information. We do not have to go—like some of the big companies—to New York to get authority to have the boys talk. We can do it instantly. We are very happy to cooperate and do it in any way we can, at any time. I feel in some cases we have helped the airbases directly.

Senator BIBLE. I understand what you are saying, and I understand you are willing to do this in the future, but that still is not quite responsive to my question.

Mr. RICKEL. We have in the past, and ever since we have been in the business, Senator Bible, helped every base that has asked us for help.

Senator BIBLE. On the very problem we have before us today, has Air Force or Defense ever said to the liquid oxygen industry, "We are contemplating a procurement of independent producing plants to produce at either 60 or 70 locations, and we would like to have you men come in and tell us your side of the story"?

Mr. RICKEL. Mr. Bible, down in Texas and New Mexico and in our area we are so far away from headquarters we get no such requests.

Senator BIBLE. I see.

Mr. RICKEL. It is strictly on a local level with us; strictly.

Senator BIBLE. I think what you have made is a splendid offer of cooperation with the Air Force, and an indication that you are perfectly willing to make your knowledge available to them. My only question is whether they apprised you of their plans of going into this as a defense operation and asked you what you thought about it?

Mr. RICKEL. They did not.

Senator BIBLE. Your answer is they did not. Right?

Mr. RICKEL. They did not.

Senator BIBLE. You have one sentence on the last page of your statement still to read. It simply says:

> This procurement achieves none of these things, and I ask that this committee take whatever action is possible to have it canceled and to revise the basic Air Force policy to meet the conditions of today.

Mr. RICKEL. May I take the liberty of adding one more comment with regard to this table we have on the next page?

Senator BIBLE. Yes, indeed.

Mr. RICKEL. We are now serving the Air Force with something like 4½ to 5 million feet of gas per month, as you see there. Last month we used and manufactured 16 million, and our plant is capable of 20 million, so we still have 4 million reserve where we can take care of additional business. Thank you very much.

Senator BIBLE. Have you been in a position adequately, efficiently, and quickly to furnish this liquid oxygen to these Air Force bases listed here?

Mr. RICKEL. Yes, sir. We haul it from our plant at Hurst, which is halfway between Dallas and Fort Worth, to Albuquerque and other points, and El Paso, 600 miles away, and I do not know of any circumstances in the 2 years we have had this contract that they were ever out of oxygen.

Senator BIBLE. Have you had any complaints from them about your services?

Mr. RICKEL. I have never had one complaint, Senator Bible.

Senator BIBLE. That is, from any of these Air Force bases you have listed here on your exhibit?

Mr. RICKEL. That is right. I have never had any complaint.

Senator BIBLE. Mr. Stults has a question.

Mr. STULTS. On your second page you say:

> Only recently the Air Force notified us that they were writing new specifications for breathing oxygen which would require a considerable outlay for instrumentation * * *.

Are the plants they are requesting in this procurement, the 1½-ton plants, going to have this instrumentation?

Mr. RICKEL. That is what I would like to know. I can assure you if they require it from private industry they should have this instrumentation in their own plants.

Mr. STULTS. I should ask the Air Force that.

Mr. RICKEL. That is right.

Mr. STULTS. Thank you, Mr. Rickel.

Senator BIBLE. Your next witness, Mr. Kean.

Mr. KEAN. Our next witness is Mr. B. F. Connor, president of the Delta Oxygen Co., Memphis, Tenn.

Senator BIBLE. Before Mr. Connor proceeds we will make the table which is attached to Mr. Rickel's statement, a part of the record at this point.

(The table referred to is as follows:)

*Big Three Welding Supply Co., Hurst, Tex., production and delivery report, month of April 1560*

| Air Force base: | Cubic feet |
|---|---|
| Amarillo | 439,027 |
| Cannon | 790,156 |
| Biggs | 519,897 |
| Kirtland | 387,532 |
| Tinker | 325,440 |
| Webb | 228,556 |
| Holloman | 731,059 |
| Walker | 631,526 |
| Perrin | 17,280 |
| Sheppard | 357,782 |
| Total, Air Force bases | 4,544,751 |
| Total oxygen used and delivered | 16,563,235 |

Senator BIBLE. Yes, Mr. Connor, you may proceed.

## STATEMENT OF B. F. CONNOR, PRESIDENT, DELTA OXYGEN CO., MEMPHIS, TENN.

Mr. CONNOR. I am B. F. Connor, president of the Delta Oxygen Co., Memphis, Tenn. I represent, at this particular moment, a portion of the industry which is faced with a very uncertain future through this particular Air Force procurement. We are those of the oxygen manufacturers who produce gaseous oxygen. At this time nearly all of us are well aware that we shall probably be forced to convert a part of our production to liquid oxygen because of the very rapid developments being made in that industry. If we are to remain in business, we must be able to serve, and, in order to serve, it shall undoubtedly be necessary for a great many of us to convert a portion or all of our production, within the foreseeable future, to liquid oxygen.

At this time I am in the midst of that every conversion. Within a very short time I shall be drawing the first liquid oxygen from my plant. At the time that I planned my conversion I took very close note of the fact that, located in Memphis, I was undoubtedly the closest available supplier of liquid oxygen to the Blytheville, Ark., Air Force Base, and it was also my belief that I would be able to bid on the Little Rock Air Force Base. Accordingly, figuring this as the potential market the decision was made to invest the money and convert our production from gaseous to liquid. This is now underway.

It is easy to realize what a shock it was to me to learn of the Air Force procurement which would place these commercial-type, permanent plants on these same Air Force bases. Obviously, the Air Force does not intend to continue their present method of procuring liquid oxygen. Consequently I have already expended a substantial sum of money for a very dubious future. Further, it is extremely doubtful in my mind if the inability to have access to this particular Air Force market will not creat a serious loss in the immediate aspect of my business, but, in fairness, I am forced to admit that the demands of private industry would have forced this conversion sooner or later.

If it is possible for the Air Force to weigh the values of this procurement against the installation of adequate storage, let me hasten

to urge that they do so. Their need is for not producing plants, but their need is for storage adequate to serve their combat needs over a prescribed period of time, say 2 weeks or a month, whatever they may choose to set.

With adequate modern storage they would have oxygen immediately available, not dependent upon production to keep it that way. Rather, let them depend for production upon the private suppliers, of whom there are at least three and possibly five within the service area of these two bases of which I am familiar. Isn't it better to have the source of their supply away from the very base which would be a target at a time of war? Isn't it better for them to have reserve storage, to have reserve producers and a full, second line of production, and a third line, as well, in this particular case?

Gentlemen, the method which they have chosen, that of installing their own plant, is probably the most expensive method they could possibly have chosen. In addition, it is interesting to note that their blueprints, besides calling for a building, which is not a portion of this procurement, also calls for 2,000 gallons of storage, apaprently in one tank, if the blueprint is any indication.

The information available to our industry indicates that heretofore they have always used 500-gallon units; units which again are the most expensive to maintain, regardless of what reason they may have for installing it.

It is my distinct feeling that the Air Force should take a long and sober look at their liquid oxygen needs; that they should come to the industry, if necessary, for the advice and the "know-how" which will enable them to solve their problems, which will in the long run enable them to work hand in hand with private industry, including newcomers such as myself, and thus avert the overall damage what they are going to do to that portion of industry which must convert to liquid oxygen.

It is essential, gentlemen, that instead of competing with us, the Air Force and the oxygen industry coordinate their efforts toward better national defense. We have no desire whatsoever to oppose the Air Force in any of their demands which are necessary for the national defense efforts. We must oppose the Air Force in a demand and procurement such as this, which is not necessary for the national defense, which is not for the good of their own efforts, but rather is probably the most expensive method they could have chosen and will do the least toward solving their problem.

Senator BIBLE. At that point, Mr. Connor, if I understood correctly the Bureau of the Budget's position this morning, they used three criteria in determining whether or not Defense should perform this service itself. They said that the main one in this particular case, as I understood the Bureau's presentation—and Defense and Air Force can speak to this later—was that it was necesary for national defense. I understood that this was the guiding factor in leading them to make this conclusion. It was necessary for national defense.

Now you say here it is not necessary for national defense.

Mr. CONNOR. We cannot understand why it is.

Senator BIBLE. I do not know whether you want to comment on that or not.

Mr. CONNOR. I do. I would like to.

Senator BIBLE. It seems to me that is the issue. They say it is, and you say it is not.

Mr. CONNOR. If it is necessary for national defense, certainly there should be three or four basic reasons, one of which I would think would be the availability of liquid oxygen. I believe during the presentation here today we have shown where there is far more liquid oxygen available in each and every area that the Air Force proposes to put these plants than they could possibly use. I think we have shown as a matter of cost—which would probably be another reason—that private industry can sell gas to them cheaper than they can make it, providing that all of the normal business expenses are taken into consideration.

As far as the quality control of the product is concerned, I believe that every reasonable demand that the Air Force has made for purity and for testing procedures has been met or equaled by private industry.

I certainly cannot see, in the event of attack, where an airbase would probably be a prime target, why it would not be better to have five or six or seven suppliers in an area dispersed to the point where it would hardly be possible to put them all out of business at the same time.

Senator BIBLE. I appreciate your observation on the point. It seems to me that is the heart of the issue.

Mr. CONNOR. I should like to recommend to the Air Force and urge them strongly to cancel this procurement for the benefit of myself and all the other small businessmen who long to serve them. I should like to ask them, further, to study and evaluate the advisability of adequate storage of the most modern types on all of the bases where they have a combat mission. This, gentlemen, is the answer, and the best answer. The best for the Air Force, the best for our industry, and the best for the United States, as well.

Senator BIBLE. Thank you, Mr. Connor. Your next witness, Mr. Kean.

Mr. KEAN. Senator Bible, our next witness was to be Mr. Marks, who was unable to come at the last minute. We have Mr. Robert McCormick who will, with your permission, read Mr. Mark's statement.

Senator BIBLE. We will be very happy to have Mr. McCormick. Mr. McCormick.

## WRITTEN STATEMENT OF PIERCE E. MARKS, PRESIDENT, MARKS OXYGEN CO., AUGUSTA, GA., PRESENTED BY ROBERT B. McCORMICK

Mr. MCCORMICK. The statement of Mr. Pierce E. Marks reads as follows:

Honorable Senators and committee members, I am Pierce E. Marks, president of the Marks Oxygen Co., in Augusta, Ga. I must apologize for my absence at this most crucial meeting, and I trust your good judgment to assure you that my absence is absolutely essential to the welfare of my business. Nothing short of that could prevent my registering my protest against this Air Force procurement personally.

The liquid-oxygen industry has been in a fluctuating state throughout the past decade. The new techniques of industry, combined with the skyrocketing demands of the Defense Department, have placed one pressure upon another, and forced the industry to expand tremendously in order to meet those demands. Our firm is presently engaged in a further expansion, not to meet the needs of

today, but to anticipate the needs of tomorrow and the day after. Until this procurement was issued, we had believed that the Air Force demands were included in that group.

We are presently serving Turner Air Force Base, one of those listed on this procurement. This base, like many others, has portable plants in a varying state of operation. The replacement of these portable units with this permanent, commercial-type plant is, in our opinion, directly competitive with our business. Further, it serves no apparent need of the national defense.

With our present facilities, we are capable and willing to supply the needs on this particular base and all others within our area. If the Air Force would install adequate modern storage, we could do this at a cost far below any production of theirs. In addition, should we fail to supply, they have any one of our five competitors to fall back on.

The Air Force has pointed out that it is possible that commercial sources could be destroyed in time of war. Further, they have maintained that our transport could conceivably be destroyed in time of war. I submit to you, gentlemen, that it is entirely possible that anyone of us could fill that particular position, but I find it hard to believe that all five of us could be knocked out and the Air Force still have any need for service at these bases.

The Air Force has further maintained that private industry is subject to strikes, labor unrest, and, in time of war, the potential of sabotage is greater. It was my understanding that more than 10 years ago a decision was made by the Department of Defense that, as an essential industry, their security police would protect oxygen even as they protect the Air Force bases. As for strikes and labor unrest, it is virtually impossible for any striking union to affect the entire oxygen industry. Certain segments of our IOMA group have been in business for 30 years or more with a record completely free of labor trouble of any kind. Further, in event of an emergency, I feel perfectly safe in saying that our industry would be mobilized and that these labor unions would in truth be employees of the Government itself, instead of the plant wherein they work. I cannot conceive strikes or labor unrest under these circumstances.

Taken from any standpoint, be it the national defense, the economics of sound productivity, or the general welfare of the Nation as a whole, this procurement is disadvantageous to them all. With an entire industry ready, willing, and able to serve the defense effort, it is destructive to that effort to ignore the industry and proceed alone. It would be advantageous to the defense effort to coordinate with the oxygen industry and proceed together.

It is my recommendation that this be done: That the Air Force cancel this procurement and avoid any possibility of destroying their allies in the defense effort. Finally, even though little attention is given these days to the matters of savings and economics, I submit that cancellation of this procurement would result in substantial savings of several million dollars, and eventually further such substantial savings, plus a production of our industry tax dollars to produce further savings. I urge that this procurement be canceled.

Senator BIBLE. Thank you, Mr. McCormick. Mr. Kean.

Mr. KEAN. Our next witness is Robert Johnson from Alaska. I think we heard from his Senator this morning, and it is pertinent to this point.

Senator BIBLE. We will be very glad to hear from you, Mr. Johnson.

## STATEMENT OF ROBERT W. JOHNSON, ASSISTANT TO THE PRESIDENT, ALASKA CHEMICAL CORP., FAIRBANKS, ALASKA

Mr. JOHNSON. I am Robert W. Johnson, assistant to the president, Alaska Chemical Corp., Fairbanks, Alaska.

Alaska Chemical Corp. operates two plants for the manufacture of liquid oxygen in the State of Alaska. The first of these, rated at 3 tons per day, is operated by the parent company in Fairbanks, Alaska. The second, rated at a ton and a half per day, is operated by Anchorage Oxygen Co., a wholly owned subsidiary, at Anchorage, Alaska.

The first of these plants is adjacent to Ladd Air Force Base and within 26 miles of Eielson Air Force Base, where the Air Force proposes to locate one of the plants in this procurement. The Anchorage plant is some 7 miles from Elmendorf Air Force Base, where they propose to locate another of these plants. Each plant is capable of serving the known needs of the bases near it. In addition, it is capable of serving all their needs and it is the express contention of our company that we should definitely be invited to do so. It is further our contention that so long as the Air Force manufactures 1 gallon of their own liquid oxygen, they are definitely competing with our plants as they do.

Gentlemen, the economy of Alaska is dependent upon the defense expenditures for its very being. The welfare of Alaska Chemical Corp. is directly related to Air Force purchases of liquid oxygen. During calendar year 1959, our overall production of liquid oxygen at Fairbanks was some 70,000 gallons. Of this production, we supplied 29,655 gallons to Ladd and Eielson Air Force Bases. This constitutes more than 40 percent of the total produced.

At no time was our plant operating at more than one-third capacity. At no time was the Eielson Air Force Base buying all their needs from us. Rather, they were operating two portable plants and we were allowed to supply them when they were unable to fill their own needs. In the truest sense, we were on standby basis. It is interesting to note the effect which this has on the civilian economy.

As you have already been told, liquid-oxygen plants produce at the lowest cost when they operate at total capacity, 24 hours per day and 7 days per week.

If the Air Force would have purchased its full requirements from our plant, they would have lowered our cost, enabling us to produce for them and the civilian economy at a lower selling price.

Thus, this policy of the Air Force has already caused the entire civilian portion of the economy to pay more for their oxygen requirements.

Gentlemen, when the Air Force maintains that their production of liquid oxygen does not compete with private industry, they are trying to unscramble scrambled eggs. How do you separate any portion of the economy from the remainder and still have the overall economy left? How can a business lose part of its potential of customers without having competition? And, however elementary the answers to these questions may be, they have been totally ignored in the Air Force statement that they are not competitive with private industry.

More than 6 years ago, we opened the Anchorage Oxygen Co. At that time, we actively solicited the business of Elmendorf Air Force Base. We used the standard technique, basic to all business, of making calls upon their procurement personnel and asking for the business. We got practically none. When we protested that it was our belief that the Government should not compete with private industry, we were told that they had been in business since 1945 and they intended to keep right on.

As the years went by, we continued to solicit, implore, beseech, and demand some of their business. Only 3 short years ago, we made offers based on cost. Quoting our prices and offering even lower prices as volume increased. We were sent a cost analysis of

the Air Force operation which proved that they could do it for less money. The most ironical section of this communication was that which admitted that undoubtedly we had cost factors which the Air Force did not have.

Of course we do. We have depreciation, which was missing because the Air Force plants are expendable. We have plant costs, labor costs, and an overhead which will not allow for sloughing it off on our neighbor, or any other member of the community. We pay all our costs ourselves and our selling price is based on those costs, plus a fair profit.

For the sake of argument, let us suppose that the Air Force had filled their demands at Elmendorf from our plant. Regardless of what those demands were and are, they would have had a material effect in lowering the price, not only to the Air Force, but also to the remaining civilian economy. In the final analysis, our profit would probably have remained the same. We would have produced more, at less cost and sold for a lower price and a lesser profit per gallon. This is the best tradition of American industry.

In 1957 and 1958, we expanded our Fairbanks plant because we were told that there would be greater need for the SAC base at Eielson. In order to accomplish this expansion, we secured a loan through the Small Business Administration for more than $300,000. We have a present balance due on that loan in excess of $200,000.

In all seriousness, should this procurement be allowed, the Air Force should buy our plant. For it will undoubtedly be up for sale when the mortgage is foreclosed by the Small Business Administration.

We realize fully that the Air Force has assured us that they will continue to meet—

**in excess of 50 percent of their requirements through private industry.**

That, however, is in the massive overall stage. The 1½-ton, commercial-type plant which they propose to put on Eielson and Elmendorf Air Force Bases is capable of filling all of their known needs. I was informed by the Department of Defense that to have this plant and not run it would be a waste of the taxpayers' money. In view of that outlook, it must follow that protestations to the contrary notwithstanding, this plant will produce all their needs. And we will lose 40 percent of our total production. We cannot stand such a loss.

Mr. MESSICK. Mr. Johnson, will you tell us if you are selling any liquid oxygen to the Air Force at the present time?

Mr. JOHNSON. We have not had an order from the Air Force since the first of the year. For the past 4 months we have not sold them 1 gallon of liquid oxygen at Eielson Air Force Base. We do supply standby storage at Ladd, which last year amounted to approximately 1,800 gallons through the year—about 150 gallons a month.

Mr. MESSICK. Do the current plans call for expanded production by the Air Force at both of these bases?

Mr. JOHNSON. That would be a difficult question to answer. In fact, until I came here to Washington, I did not even know they had two portable plants. In all our correspondence and discussions with them there, they told us that they had one. They were operating a portable plant. It was only when we got here that we heard they had two of them.

Now they claim when they get rid of one of these 1-ton plants and get a ton-and-a-half plant, they will be really cutting their expenses, but I doubt it.

Mr. MESSICK. How long before 1960 had you been selling to the Air Force?

Mr. JOHNSON. We started selling to the Air Force and elements of the Department of Defense in 1942. In fact, they took over our plant in World War II and we bought it back in 1946. So we have been selling constantly.

Mr. MESSICK. I suppose in an emergency your production capacity would be available to the Air Force in the same pattern as it was in World War II?

Mr. JOHNSON. We anticipated that and offered, on at least three occasions that I know of, the opportunity to bring their personnel into our plant and we would train them and we would not charge for it. All they had to do was bring them in and we would train them.

Mr. MESSICK. So, beyond any doubt your capacity would be available for defense needs?

Mr. JOHNSON. Definitely.

Mr. MESSICK. I wonder if you can tell us at this point any way in which your production costs might be different from the production costs in other States?

Mr. JOHNSON. Basically our power cost is five times the figure used by Mr. Josephian in computing the costs of operating the Air Force plant. Our low-end rate is 5 cents per kilowatt-hour as compared with roughly 9 mills in California and 13 mills in this area right here. That is one way. And power is a large factor in the production of liquid oxygen.

Secondly, our labor costs average just about 40 percent higher than the average of the original 48 States. We pay a man who operates our plant $4.30 per hour as against the $2 figure mentioned here, and supervisors are paid $4.80. Our plant superintendent receives $17,000 per year, plus a free house, plus certain other advantages.

Labor and power are the two primary cost factors, but incidentally we also pay for our water at the rate of $1.13 a thousand gallons.

Senator BIBLE. May I clear my own thinking? You say you do not sell any liquid oxygen now to either one of the Air Force bases? Is that right or wrong?

Mr. JOHNSON. We simply keep what they call the "pots" full out in Ladd on a standby basis. We haven't sold 1 gallon to Eielson in 1960.

Senator BIBLE. My understanding is they have two 1-ton plants at Eielson at the present time?

Mr. JOHNSON. That is correct. At Elmendorf we have only enjoyed standby since 1953 when we went in business. They buy from us only when they absolutely have to have it.

Senator BIBLE. The thing that occurs to me is that you say now they told you that, by getting one 1½-ton liquid oxygen plant in the place of two 1-ton units, they will be, in effect, saving money. But, even if we were not considering the present procurement, how would that help you? It looks to me as though you are in bad shape up there, anyway.

Mr. JOHNSON. Well, we get a choice of being shot or hung.

Senator BIBLE. That is an unpleasant alternate, isn't it? But even if this procurement did not go through—if the procurement was canceled out—would that help you?

Mr. JOHNSON. Well, sir, I am back where I was with the Defense Department. I contest very greatly the initial policy which they maintain they have had for several years.

To me it is exactly as I told them—it is like Colonel Stoopnagle's famous stopwatch with the steam whistle on it. It is very handy in case anybody asks you if you have a stopwatch with a steam whistle on it. You can answer "yes." The policy was possibly needed at the time it originated. I am not aware whether it was or not, but it has long since passed its day of usefulness. It is now destructive. It is wasteful and it is unnecessary. It should be removed because the defense, if it destroys what it is defending, is no defense at all.

Senator BIBLE. Your problem is considerably different from most of the other witnesses. As I understand it the burden of most of the other witnesses is that if Defense procured the 1½-ton liquid oxygen plants they would either materially cripple them or possibly put them out of business. Your point is that you are hurt already by virtue of their having two 1-ton liquid oxygen plants in operation at Eielson, Alaska.

Mr. JOHNSON. Yes.

Senator BIBLE. So you are not as vitally concerned in this immediate procurement as are others in your industry. Is this correct?

Mr. JOHNSON. Well, sir, as long as they have this—the term in the trade is "peanut poppers"—the little 1-ton portables operating on the base, they will always have a need for us because they will have to buy something from us. They cannot—the things do not operate well enough and long enough over a period of time. As an example, during normal use they have made surplus three of these at Elmendorf Air Force Base in the last 6½ years. They wear out and break down and, like the girl with the wart on her nose, we are available.

It is not a desirable situation but it is a question of possibly bleeding to death against dying instantly.

If they get this commercial type in there, then we know definitely that they are in a different phase of operation altogether.

Senator BIBLE. Then the procurement does hurt you in that respect?

Mr. JOHNSON. In that respect, it does.

Senator BIBLE. Because they will then be able to produce all of their needs for liquid oxygen in their own defense plants. Is that right?

Mr. JOHNSON. Yes.

Senator BIBLE. And they will not take anything from you then. Is that right?

Mr. JOHNSON. That is correct.

Senator BIBLE. I wanted to see how you were affected by it.

Mr. JOHNSON. Yes.

Mr. STULTS. They would also have a substantial investment in the new plants. They would say, as Defense already told you, it would be a great waste of taxpayers' money to have this brandnew liquid oxygen plant standing around idle. Is that correct?

Mr. JOHNSON. That is correct. When you asked one question there, I should perhaps explain the reason for it. You say we are hurt more

than the others possibly. We are also one of the newest States and we did not have a real voice before. As a territory many things were possible in Alaska.

Senator BIBLE. You have three able voices up here now.

Mr. JOHNSON. We are deeply grateful for them.

Senator BIBLE. You may proceed.

Mr. JOHNSON. We in Alaska have the highest production costs under the American flag, with the exception of the Air Force bases. We have the heaviest tax burdens, and as a people and a State we have problems that, like our mountains, seem insurmountable. Those of us who are there today realize fully that we shall never see the great State that shall come to the great land, Alaska. We shall be lucky if we are able to witness the laying of the cornerstone of that State-to-be. For we are the State of the 21st century.

It is essential to our future and the future of the Nation that our growth be impeded only so much as is absolutely necessary. It is my profound feeling that active competition from the Air Force, or any other portion of the Government, is neither natural nor necessary.

Further, and at the express risk of proving small, neither my company nor myself desire to depend on the largesse of a benevolent patron. We do not want the assurance that we will be given the same amount of business as last year. Nor do we want to be "given" anything. We desire to earn our way, make a profit, and pay our taxes in the best American manner.

We are deeply indebted to the Air Force and all elements of the Department of Defense for the great aid which they have given to the development and growth of our State. We regret deeply the necessity to oppose violently their basic policy and the extension of that policy that takes the form of this procurement.

For the good of the defense effort, the good of Alaska, and the general well-being of the Nation, we urge that this policy be eliminated and that they devise a new policy which will be equal in excellence with the men that they have sent and are sending to carry it out.

We beseech this committee to take whatever steps are necessary to bring this to pass.

Senator BIBLE. Mr. Stults.

Mr. STULTS. Mr. Johnson, you have 5-cent power. Is there any way that the Air Force gets it substantially cheaper than you?

Mr. JOHNSON. None that I know of. I know of nothing that can be produced cheaper by them than by us.

Mr. STULTS. They have to use the same basic form of generation of electric power that private industry does?

Mr. JOHNSON. They do. They use coal. Steam generators and coal for their fuel.

Mr. STULTS. Do they get their water more cheaply than you?

Mr. JOHNSON. I would not know about that. It is possible that there they could surpass us, for we depend on wells, which is a very expensive way to produce your water in Alaska. There is one thing I would like to add if I might.

I never knew before the method used by the Bureau of the Budget in analyzing the necessity of individual operations. It seems to me, and I hope it will not be thought out of line, that they who represent the civil portion of this population should provide a means for the

civil portion to be heard in matters such as this; that they consult with them even as they do with the Department of Defense, to weigh and analyze the needs and the possible damage, and the value overall of the things which are under their direction.

It seems to me that it would only be natural, since they are in reality the gage which limits and controls these operations, that both sides should be heard; and not to do so seems to be an ex parte decision. They cannot come to any other.

Senator BIBLE. That is why we are very thankful we have a congressional committee that can serve as a forum to look at both sides of the coin and attempt to be helpful in resolving these problems. Mr. Stults.

Mr. STULTS. I have no further questions.

Senator BIBLE. Mr. Messick.

Mr. MESSICK. No questions.

Senator BIBLE. Thank you very much, Mr. Johnson. Our next witness, Mr. Kean.

Mr. KEAN. Mr. Robert McCormick, a versatile man. He used to be an Air Force major and pilot. He is one of the owners, the vice president, and a director of the Burdett Oxygen Co. in Norristown, Pa., and is a practicing attorney in Syracuse, N.Y. He is our legal counsel. Mr. Robert McCormick.

Senator BIBLE. We will take him under another hat.

Mr. KEAN. A new hat.

Senator BIBLE. All right. We welcome you back again, Mr. McCormick.

## STATEMENT OF ROBERT B. McCORMICK, ONE OF THE OWNERS, OFFICERS, AND DIRECTORS, BURDETT OXYGEN CO., NORRISTOWN, PA.; AND DIRECTOR AND LEGAL COUNSEL FOR THE INDEPENDENT OXYGEN MANUFACTURERS' ASSOCIATION

Mr. MCCORMICK. Thank you, sir. Before starting I would like to make one suggestion, that we put the specifications and the drawings and blueprints—which I believe are a part of the specifications—into this record, if that has not already automatically occurred.

Senator BIBLE. If there is any misunderstanding of that, the reporter will be sure that those of the exhibits which accompany the industry's bound presentation that can be legibly reproduced are made a part of the record, as well as the specifications, drawings, and blueprints.[2]

Mr. MCCORMICK. Thank you. I would like to spend a few minutes discussing what we believe to be the proper application of Bureau of the Budget Bulletin No. 60–2, dated September 21, 1959, to the problem at hand.

The purpose of the bulletin is stated in section 1, in part—

> to clarify the application of existing policy regarding competition between the Government and private enterprise * * *.

The said existing policy as set forth in section 2 of the bulletin seems to us to be crystal clear, to the effect that—

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[2] See app. III, p. 176.

the Federal Government will not start or carry on any commercial-industrial activity to provide a service or product for its own use if such product or service can be procured from private enterprise through ordinary business channels.

The bulletin correctly provides for certain exceptions to this no-competition policy in section 3, but prefaces the list of exceptions by stating that, in the case of specific situations where factors may make it necessary or advisable for a Government agency to produce goods or services for its own use—

the burden of proof lies on the agency which determines that an exception to the general policy is required,

that a finding must be made that there are compelling reasons for the exception before it is authorized and that before such a finding is made—

all relevant factors must be taken into account, including pertinent economic and social aspects of public policy, even though they may not be the immediate concern of the agency or official directly responsible for this particular activity.

The exceptions listed are found in section 3 under paragraphs A, B, and C, and are three in number: (1) National security, (2) costs, (3) clear unfeasibility about which we feel as follows:

The national security exception seems to be confined to cases where—

for reasons of national security, an activity cannot be turned over to private industry.

The Air Force in arguing for the installation of producing plants on air base, seems to hang its hat on the words—

functions which must be performed by Government personnel in order to provide them with vital training and experience for maintaining combat units in readiness.

We submit that the production of liquid oxygen is not at all a function which—

must be performed by Government personnel in order to provide them with vital training and experience for maintaining combat units in readiness.

We do not agree at all that, as the Air Force contends, the necessity for Air Force production of oxygen has been "adequately covered" in the arguments contained in its paragraph "a," outlining Air Force policy, and as an aside, the paragraph "a" I am referring to is contained in a document which accompanied a letter stating policy, mailed to the Honorable John J. Sparkman, chairman of the Select Committee on Small Business, by Philip LeBoutillier, Jr., Acting Assistant Secretary of Defense, Supply and Logistics, dated April 29, 1960. This particular document outlines the Air Force policy on this particular matter.

To the contrary, we feel that the testimony offered by industry representatives who preceded this speaker has adequately demonstrated just the opposite to be true—that production should be left in the hands of private industry, while adequate, protected and dispersable storage should be the Air Force's proper function. The training which we feel is required by military personnel is that directed toward understanding and handling storage and filling operations, an easier, less expensive, less time-consuming matter than teaching airmen to become oxygen manufacturers.

As to "costs" exception, the Air Force has not chosen to "adequately cover" this one, which relates to situations where the Government

agency can produce cheaper than private industry. We therefore assume that the Air Force concedes it cannot, with its proposed 1½-ton plants, produce as cheaply as we.

In its "clear unfeasibility" exception, Bulletin No. 60–2 indicates that "unfeasibility" would be likely to occur under circumstances where the product is either—

(1) An integral function of the basic mission of the agency, or
(2) Not available in the particular instance, nor likely to become available commercially in the foreseeable future because of the Government's unique or highly specialized requirements or geographic isolation of the installation * * *.

I have not covered item 3 under that which refers to where it is administratively impractical to contract for commercially.

For reasons already stated we do not see how production of oxygen can be considered an integral function of the base—storage, yes; production, no.

The present productive capacity of our industry, its ability to deliver to existing Air Force bases, and the present available storage equipment which will provide ready-at-hand on each base the quantities required for war readiness, as have been discussed, hardly would seem to demonstrate the "clear unfeasibility" of letting private industry perform its primary function, the production of liquid oxygen.

Bulletin No. 60–2 should in this case be given the interpretation it clearly sets forth, and the Air Force should not here be allowed to defeat the Government's strongly worded mandate that it not compete with private industry where the product can clearly be procured from a willing, able, and anxious commercial oxygen industry.

Senator BIBLE. Thank you very much, Mr. McCormick. May I ask you just one question. As I understand it, you are chief legal counsel for this Independent Oxygen Manufacturers' Association. Is that right?

Mr. MCCORMICK. Yes, sir.

Senator BIBLE. Have you ever attempted to set up a meeting with Air Force to sit around the table and tell them how this 70-plant procurement affects your people?

Mr. MCCORMICK. No, sir. The first our association learned of the 70 plants in the first place was comparatively recently, when, by a chance telephone conversation with one of the manufacturers who was going to bid on these plants, the subject was brought up. If that particular telephone conversation had not been held, we wouldn't be sitting here today, nor would we have known anything about the procurement until the plants were ordered. If it hadn't been for Mr. Kean, who happened to have that original conversation, we wouldn't be here.

Senator BIBLE. I see. So, up to date you have not had the opportunity of sitting around with representatives of the Air Force to see if you can resolve this problem.

Mr. MCCORMICK. No, sir; we have not.

Senator BIBLE. All right. Thank you very much. I have no further questions.

Mr. STULTS. Following through on that, Mr. Kean, do you know if other members of the industry had heard about this earlier or have talked about it with the Air Force?

Mr. KEAN. None that I am aware of, other than possible bidders, and to my knowledge they rather kept quiet among themselves.

I would like to correct one statement of Mr. McCormick in which he said "a bidder." A manufacturer who did not intend to bid tipped me off.

Mr. STULTS. But he was contacted because he might make the plants.

Mr. KEAN. That is correct. But no oxygen manufacturer that I know of was ever contacted.

Senator BIBLE. I think that is all, Mr. McCormick.

Mr. Kean, I see you have a short closing summary. I would be very happy to have you give it.

Mr. KEAN. May I take half a minute to stipulate as to the Air Force, I think we quoted 45 days' production in liquid oxygen storage and there was head-shaking over there. We will stipulate 2 days. I figure out 43 instead of 45 days.

Senator BIBLE. Very well. Go ahead.

Mr. KEAN. There are no other witnesses you would rather hear at this time?

Senator BIBLE. We have one witness. Mr. Paul Askew has asked permission to appear. He is the assistant to the general president of the International Union of Operating Engineers, but I shall hear him after you have made your concluding industrial statements.

Mr. KEAN. Fine.

Gentlemen, I believe that the speakers who have just finished have clearly demonstrated the following points:

1. That private industry can deliver to Air Force bases with existing production facilities all the Air Force's foreseeable requirements, at a cost substantially less than would be the case with the proposed plants.

2. That presently available storage equipment can assure to all Air Force bases an onhand supply of the oxygen requirements of each.

3. That, under conditions of war, widely dispersed commercial sources of liquid oxygen are less likely to be destroyed than the airbases themselves.

4. That the proposed plants are not, in any normal meaning of the word, deployable.

5. That the function of producing oxygen is not a necessary or proper function of Air Force personnel.

6. That Air Force production of liquid oxygen would cause serious and, in some cases, disastrous economic effects on private producers.

7. That competition of a government agency with private industry such as is contemplated here is directly contrary to the announced policy of the Government.

8. That other armed services do not follow this competitive policy.

Taking all this into consideration, we strongly feel and urgently recommend that 64 of the proposed 70 liquid oxygen plants be canceled, and that the Air Force get out of the business of producing oxygen at any base which can be served by existing private industrial facility.

We further recommend that the Air Force consider sitting down with a committee composed of qualified private manufacturers and work with such a committee to the end that an efficient supply and

storage system be set up to adequately supply the wartime requirements of Air Force bases.

At this time I would like to take the opportunity to thank the committee and all the Members for their time. We know it has been tiring and long. We appreciate it greatly.

Senator BIBLE. Thank you very much, Mr. Kean. I think your association is to be complimented upon the very able presentation they have made. It may be a small business item but you make a presentation as if you were a big business concern. Thank you.

Mr. KEAN. Thank you, sir.

Senator BIBLE. Our next witness is Mr. Askew. We are very glad to have you with us, Mr. Askew.

Mr. ASKEW. Thank you, Mr. Chairman.

## STATEMENT OF PAUL A. ASKEW, ASSISTANT TO THE GENERAL PRESIDENT OF THE INTERNATIONAL UNION OF OPERATING ENGINEERS, WASHINGTON, D.C.

Mr. ASKEW. Mr. Chairman and honorable members of your committee, my name is Paul A. Askew, assistant to the general president of the International Union of Operating Engineers. The subject matter before your committee dealing with whether or not the U.S. Air Force shall purchase and operate liquid oxygen plants is a matter of the most vital concern to the thousands of our members throughout 50 States. We are familiar with the policy of the Air Force with reference to this specific matter, as well as the position taken by the Air Force in related matters which were considered by committees of Congress last year. With reference to the policy set forth by the Air Force in this matter, if allowed to become effective it would result in the unemployment of great numbers of our members now employed by private industry in the free enterprise system in this country. Their names would begin appearing on the unemployment rolls for unemployment compensation and, when this was depleted, on the welfare rolls, perhaps even of charitable institutions. While these things would within themselves be detrimental to the best interests of the free enterprise system in this Nation and the people as a whole, we are equally concerned with the continued appearance of some of the reasons given by the Air Force for its rapidly expanding encroachment on the free enterprise system where free management and free labor have built the greatest nation ever known to man. The Air Force seems convinced that the word "strike" has become an evil word in the language of our country, and to allege that a strike might occur for the benefit of their argument in any situation wins sympathy with government, the Congress, and the public.

Last year the Air Force used the bugaboo of possible strike when they began their program of evicting free management and free labor from the SAGE plants in the United States and did so despite the fact that in nearly 5 years of operation of these plants by free management and free labor, not one single second of work stoppage was ever caused by virtue of a labor dispute of any nature. The Air Force was so successful with this argument that many of our mem-

bers, displaced from these plants, now walk the streets of America looking for work and a livelihood for their families.

Now again the Air Force comes forth with this same skeleton to frighten and stampede the people and your committee into believing that government should be further extended into competition with business which multiplies many times the cost to the taxpayers. The Air Force states in their policy, and I quote here, that—

> (h) Commercial corporations are subject to strikes and labor disruptions in both the fields of production and transportation. Complete reliance upon commercial sources combined with such an occurrence could leave the Air Force helpless at the most crucial times. Moreover, in time of an emergency, the importance of liquid oxygen to the defense effort could lead to these commercial sources not actually destroyed becoming prime objects of sabotage.

This paragraph in the policy of the Air Force in my language is the guts of their whole argument which seems to be quite clearly admitted by them when the follow in the next sentence and say:

> The foregoing are the *primary reasons* [emphasis added] why we consider an on-base capability essential to our war potential.

I beg the members of this honorable committee to consider that here the Air Force, apparently without hesitation and as evidenced by their continued use of this argument apparently confident that it will sustain their position, is doing so without having examined the record of the capability of free management and free labor in the oxygen industry to supply any amount of their products at any location, and, more specifically, they have not examined the record nor do they seem to care what the labor-management relationship has been in 50 years in this industry. Since this seems to be a point which they make so much of but seem to care so little about apprising themselves of the facts, I should like to take this opportunity to acquaint your committee with the facts on this point, which I feel sure will be equally as surprising to the Air Force.

For your information, gentlemen, none of the manufacturers who are represented here today nor any of the other independent manufacturers throughout 50 United States has ever been struck in the past four decades. Yet the Air Force continues to pull this old chestnut out, dress it up, and present it to this committee as a valid primary reason for their continued encroachment upon free management, free labor, and the free enterprise system.

I hope, gentlemen, that you will realize that this is in effect an attack upon the free enterprise system; that these products must be manufactured and produced under military commanders and their troops. Who is to say that your committee won't be holding hearings next week about another product that the Air Force wants to manufacture? Will they declare that they are going to stop here; that, of the many thousands of products they need, this is the only one they want to manufacture? Or will they continue at their rapid pace of putting the workers of this Nation in uniform to produce the goods used by them?

We refuse to allow a record of labor peace to become the source of the destruction of our employers—and I might add good employers, Mr. Chairman—and free labor, and we urge this committee to disregard completely this particular element of the Air Force policy.

It is neither factual, valid, nor fitting. Gentlemen, not only the Operating Engineers but all of the United States is dependent upon your good judgment to screen these desires of the Air Force and to protect the free enterprise system. I hope you are able to recognize the facts and to take whatever steps necessary through your committee to keep the Air Force out of this industry which has done such a wonderful job of filling their demand without exception.

In closing, Mr. Chairman, I would like to say, because of having listened to some of the testimony here today dealing with the subject of training personnel in uniform to operate these, it would be well if this committee might ask the Air Force to give them some sort of information on what their experiences have been when they moved into plants and took them over by uniformed personnel, inexperienced, and having to be trained. I have reports that as a result of the Air Force taking over the SAGE installations which they felt and said in this case, although we had not had any strikes, that they might cease to operate because of strikes. Since they have taken these plants over, we have information, reports coming to us, that a considerable number of them have been put out of operation and off the line completely because of plant failures due and attributable to the lack of experience of those people to operate.

I am advised as an example that on the 18th day of April at Bangor, Maine—where our members have been displaced, members who had made lifetime careers of training themselves, of developing an occupation, of learning how to operate and operating effectively, heat, air-conditioning and power installations—that that plant was blown off the map on the 18th day of April by boiler explosions and was completely out of existence or out of operation.

I think that similar situations will probably be found where these installations have gone off the line at Fort Lee, Va., at Great Falls, Mont., and at Grandview, Mo., and others.

I don't want to muddy water by bringing in and injecting this SAGE installation into it except through the relationship that it has with the ability of the Air Force to move into even liquid oxygen plants which I believe to be equally complicated in their operations, only to that extent, but I do think it is something closely associated with it. It might be of value to this committee in their considering the subject.

Mr. Chairman, for and in behalf of the men who work in these plants throughout the Nation and who have worked well with the employers, the opportunity to appear before your committee and leave you their views and feelings is very much appreciated, and I thank you.

Senator BIBLE. I appreciate your presence here, Mr. Askew. I certainly think you make a very effective statement. Your point is that this industry has not been struck in the past four decades, and since it has not been in the past four decades, the Air Force cannot very well use strikes as one of the reasons why they have to move into the field.

Mr. ASKEW. And certainly is not a primary reason as they describe in their policy, Mr. Chairman.

Senator BIBLE. Thank you, Mr. Askew.

Our next witness will be Mr. R. A. Crist, Director of Production Policy, Department of Defense.

Mr. Crist, will you identify the gentleman with you?

Mr. CRIST. This is Mr. A. W. Buschman who is staff director in the Office of Production Policy, of my staff.

Senator BIBLE. Department of Defense?

Mr. CRIST. Department of Defense.

## STATEMENT OF RUSSELL A. CRIST, DIRECTOR, PRODUCTION POLICY, OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE (SUPPLY AND LOGISTICS); ACCOMPANIED BY A. W. BUSCHMAN, STAFF DIRECTOR, OFFICE OF PRODUCTION POLICY, OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE (SUPPLY AND LOGISTICS)

Senator BIBLE. In reading the first page of your presentation I note that you are responsive to the letter of April 27 in bringing the committee up to date on the activities of the Department of Defense in this area since the May 1957 hearings.

Now, as to the first phase—and this is responsive to our request—I am wondering if this covers the same type of presentation that was made this morning by Mr. Staats, from the Bureau of the Budget.

Mr. CRIST. There may be some duplication but I think you will find in here a statement, or several statements, that apply specifically to the activities of the Department of Defense, as compared with the civilian agencies set forth by the Bureau of the Budget this morning.

Senator BIBLE. All right.

Mr. CRIST. Otherwise I think there is very little duplication.

Senator BIBLE. You may proceed.

Mr. CRIST. Mr. Chairman and members of the committee, I am pleased to appear before you to discuss the status of the Department of Defense program relative to the commercial- and industrial-type activities operated by the military departments.

In your letter of April 27, 1960, it was suggested that first, we bring the committee up to date on the activities of the Department of Defense in this area since the May 1957 hearings, and second, we be prepared to discuss the problem of liquid oxygen procurement by the Department of the Air Force.

Dealing now with part I, at this time I would like to say that Mr. Buschman has the particular responsibilities for the application of policy 60–2 and he will supplement any remarks in response to your questions.

In order to provide a résumé of our Department of Defense commercial- and industrial-activities program since the last appearance before this committee during May 1957, I have a summary of the decisions that have been made through June 1959. With your permission I would like to offer this summary for the record.

Senator BIBLE. It may be received.

(The document referred to is as follows:)

ACTIVITY REPORT, COMMERCIAL-INDUSTRIAL REVIEW PROGRAM

| | Original cases Jan. 1, 1954 to Jan. 1, 1958 | Resurvey cases Jan. 1, 1958 to Jul. 1, 1959 | Total (estimated) [1] | Total surveys and resurveys | Miscellaneous |
|---|---|---|---|---|---|
| Number of activities surveyed | 1,679 | 695 | ---------- | [2] 2,374 | ---------- |
| Actually discontinued | 268 | 63 | [3] 331 | ---------- | ---------- |
| Actually curtailed | 57 | 13 | 70 | ---------- | ---------- |
| Decisions made to discontinue | 127 | 77 | [4] 204 | ---------- | ---------- |
| Decisions made to curtail | 133 | 11 | 144 | ---------- | ---------- |
| Estimated number of activities in being as of Jul. 1, 1959 | ---------- | ---------- | ---------- | ---------- | 1,263 |
| Number of activities scheduled: | | | | | |
| For resurvey period Jul. 1, 1959 to Jan. 1, 1960 | ---------- | ---------- | ---------- | ---------- | 164 |
| For resurvey after Jan. 1, 1958 | ---------- | ---------- | ---------- | ---------- | [5] 1,100 |

[1] As of late 1957 and early 1958, the military departments were authorized to act on their decisions to continue, discontinue or curtail activities without referral to the Office of the Secretary of Defense.

[2] It will be recognized that surveys and resurveys tend to confuse the totals shown, as many of the approximate 695 surveys cover activities included in the original cases.

Statistics as reported do not always discriminate between original and subsequent surveys.

[3] 331 activities or approximately ⅓ have been closed. The remaining activities have previously been justified, and closings are becoming more difficult.

[4] Decisions to take action, and actual closings may overlap to some extent, because of the time, sometimes up to 2 years, necessary to accomplish the desired result. Included in the decisions to discontinue, are approximately 120 telephone systems, on which action is being held in abeyance.

[5] For the reasons noted above, an accurate figure balance is difficult, and in some cases, estimates are necessary.

NOTE:—New starts: 3 were approved and 7 disapproved during this period.

41 activities were deleted during the first 6 months of 1959, as being too small to come within the report ing requirement, as follows: 5 automotive repair shops; 1 ice plant; 35 office equipment repair shops. Each of these represents a capital investment of less than $5,000, and an annual output of less than $25,000.

*Commercial-industrial review program, Jan. 1, 1958, to July 1, 1959*

| Category | Total surveys [1] | Actions finalized [2] to— | | Decisions made to— | |
|---|---|---|---|---|---|
| | | Discontinue | Curtail | Discontinue | Curtail |
| Aluminum sweating plants | 4 | ---------- | ---------- | ---------- | ---------- |
| Arsenal type facilities | 9 | ---------- | ---------- | ---------- | ---------- |
| Automotive repair shops | 236 | 11 | 2 | 13 | 2 |
| Bakeries | 20 | 2 | ---------- | 2 | ---------- |
| Cement mixing plants | 1 | ---------- | ---------- | 1 | ---------- |
| Chain manufacturing | ---------- | ---------- | 1 | ---------- | ---------- |
| Clothing factories | 1 | ---------- | ---------- | ---------- | ---------- |
| Clothing reclamation shops | 1 | 4 | ---------- | 1 | ---------- |
| Electrical systems | 1 | ---------- | 1 | ---------- | 1 |
| Furniture repair shops | 1 | 4 | ---------- | 1 | ---------- |
| Ice plants | 1 | 1 | ---------- | 1 | ---------- |
| Laundries and dry cleaning plants | 80 | 3 | ---------- | 3 | ---------- |
| Local water transportation | 1 | ---------- | ---------- | ---------- | ---------- |
| Model pattern shops | 9 | ---------- | ---------- | ---------- | ---------- |
| Motion picture studios | 5 | ---------- | ---------- | ---------- | ---------- |
| Office equipment repair shops | 52 | 6 | ---------- | 4 | ---------- |
| Optical instruments and lenses | 1 | 1 | ---------- | 1 | ---------- |
| Oxygen and nitrogen plants | 2 | ---------- | ---------- | ---------- | ---------- |
| Paint factories | 2 | 2 | ---------- | 2 | ---------- |
| Paperboard containers | 13 | 2 | ---------- | 2 | ---------- |
| Photographic equipment and supplies | 3 | 3 | ---------- | 3 | ---------- |
| Powerplants | 8 | ---------- | ---------- | ---------- | ---------- |
| Printing plants | 2 | 1 | ---------- | 2 | ---------- |
| Quartz crystal fabrication | 3 | ---------- | ---------- | ---------- | ---------- |
| Research, development and testing laboratories | 1 | 1 | ---------- | 1 | ---------- |
| Ropewalk | ---------- | ---------- | 1 | ---------- | ---------- |
| Sawmills | 1 | 1 | ---------- | 1 | ---------- |
| Shoe repair shops | 14 | 7 | ---------- | 4 | ---------- |
| Telephone systems | 162 | 8 | ---------- | 15 | ---------- |
| Tire-retreading plants | 5 | ---------- | ---------- | 1 | ---------- |
| Tree and garden nurseries | 23 | 2 | 8 | 15 | 8 |
| Watch, clock, and jewelry repair | 3 | ---------- | ---------- | ---------- | ---------- |
| Wooden containers | 30 | 4 | ---------- | 4 | ---------- |
| Total | 695 | 63 | 13 | 77 | 11 |

[1] Includes resurveys.

[2] Actions and decisions shown above may result from surveys and resurveys made within this or previous periods.

*Commercial-industrial review program, Jan. 1, 1954, to Jan. 1, 1958*

Number of activities:

| | |
|---|---|
| Total surveyed | 1,679 |
| Discontinued | 268 |
| Curtailed | 57 |
| Being discontinued | 127 |
| Being curtailed | 133 |
| Not yet discontinued or curtailed | 1,094 |

| Category | Number of activities | | | | | |
|---|---|---|---|---|---|---|
| | Total surveyed | Discontinued | Curtailed | Being discontinued | Being curtailed | Not yet discontinued or curtailed |
| Acetylene manufacturing | 7 | 1 | | | 1 | 5 |
| Aluminum sweating | 9 | 1 | | | 2 | 6 |
| Arsenal type facilities | 26 | | | | | 26 |
| Automotive repair shops | 405 | 61 | 5 | | 25 | 314 |
| Bakeries | 58 | 26 | | 1 | | 31 |
| Bus operations | 16 | | | | 16 | |
| Caustic soda manufacturing | 1 | 1 | | | | |
| Cement mixing plants | 18 | 12 | | | | 6 |
| Chain manufacturing | 1 | | 1 | | | |
| Chlorine manufacturing | 1 | 1 | | | | |
| Cloth sponging plants | 1 | 1 | | | | |
| Clothing factories | 2 | | | | | 2 |
| Clothing reclamation shops | 5 | 1 | | | 1 | 3 |
| Cobbler shops | 56 | 23 | | | | 33 |
| Coffee roasting plants | 4 | 4 | | | | |
| Dry cleaning plants (see laundries) | | | | | | |
| Engine container repairs shops | 1 | 1 | | | | |
| Furniture repair shops | 4 | 1 | | | | 3 |
| Ice cream manufacturing | 5 | 4 | | | | 1 |
| Ice plants | 16 | 9 | | 1 | | 6 |
| Laundries and dry cleaning plants | 136 | 7 | | | 11 | 118 |
| Lighting fixtures | 1 | | | | | 1 |
| Logging and sawmills | 10 | 9 | | | | 1 |
| Miscellaneous fabricated products (quartz crystals) | 6 | | | | 1 | 5 |
| Models and patterns | 9 | | | | | 9 |
| Motion picture studios | 5 | | | | | 5 |
| Office equipment repair shops | 199 | 31 | 1 | 2 | 55 | 110 |
| Ophthalmic goods | 5 | | | 1 | | 4 |
| Oxygen, nitrogen, and hydrogen manufacturing | 6 | 1 | | | | 5 |
| Paint manufacturing | 2 | | | | 2 | |
| Paperboard boxes | 23 | | | | | 23 |
| Photographic equipment and supplies | 3 | | | 1 | 2 | |
| Plastic laminating operations | 13 | 1 | | | | 12 |
| Powerplants | 36 | | 1 | | 2 | 33 |
| Printing plants | 87 | 23 | 40 | 4 | | 20 |
| Ropewalk | 1 | | 1 | | | |
| Scrap metal baling | 29 | 11 | 2 | | 6 | 10 |
| Sheet metal work | 1 | | | | 1 | |
| Ship repair | 4 | | | | | 4 |
| Shipyards | 12 | | | | | 12 |
| Surgical and medical instruments and supplies | 11 | 2 | | | | 9 |
| Telephone systems | 309 | | | 111 | 5 | 193 |
| Tire retreading activities | 7 | | 5 | | 1 | 1 |
| Tree and garden nurseries | 60 | 34 | 1 | 4 | 2 | 19 |
| Uniform shops | 1 | | | | | 1 |
| Watch, clock, and jewelry repair shops | 7 | | | | | 7 |
| Wood preservation | 1 | 1 | | | | |
| Wood products | 1 | 1 | | | | |
| Wooden containers | 58 | | | 2 | | 56 |
| Total | 1,679 | 268 | 57 | 127 | 133 | 1,094 |

Mr. CRIST. These data show also the total number that have been surveyed in each classification.

From January 1954 to January 1958, 1,679 cases were surveyed. In this period decisions were made to discontinue a total of 395 activities and to curtail 190. From January 1958 through June 1959,

695 activities were surveyed or resurveyed. In this period decisions were made to discontinue 140 and to curtail 24. Thus, of the total of 2,374 surveys or resurveys, decisions to discontinue or curtail activities aggregate 749.

Included in these statistics are a number of decisions to discontinue activities on which action to effect the decision has been deferred because of factors beyond the immediate control of the Department of Defense. As an example, there are approximately 120 telephone systems on which action to discontinue Government ownership and operation has been withheld. Legislation is being proposed to the Bureau of the Budget in the hope that the Congress will provide the necessary authority to discontinue these services as Government owned and operated facilities and at the same time permit private enterprise to continue the service to the Department of Defense.

Decisions on whether to continue, discontinue or curtail operations reviewed are based upon policy and criteria expressed within a Department of Defense directive which has been the basic guide for this program since 1955. This policy directive expresses the Department of Defense support of the basic principle that free competitive enterprise should be fostered by Government and sets forth principles and criteria governing the conditions under which Government operation of an activity is warranted, based on review of activities in question.

On September 21, 1959, the Bureau of the Budget issued Bulletin 60–2 which placed emphasis on evaluating activities of the greatest significance and budgetary impact, though it has not in any sense changed the policy. The Department of Defense in implementing this bulletin has endeavored to insure that all commercial and industrial activities are inventored and reviewed. Special emphasis has been placed upon major items, such as arsenals, shipyards, aircraft, ship, and vehicle maintenance and repair; transportation on a worldwide basis; communication; and warehousing and storage. Because of the magnitude of activities it was necessary to make certain arrangements with the Bureau of the Budget for the Department of Defense to review the program in an orderly fashion.

The Department of Defense implementation of the Bureau of the Budget Bulletin 60–2 was issued by the Secretary of Defense to the Secretaries of the military departments November 30, 1959. Detailed instructions were issued on the same date by the Assistant Secretary of Defense (Supply and Logistics) providing for the inventory of activities falling within the scope of this program and the scheduling for reviews to be accomplished. At this point, I would like to supply copies of these implementing documents for the record.

Senator BIBLE. It may be understood they will be incorporated in the record at this point.

(The documents referred to follow:)

THE SECRETARY OF DEFENSE
WASHINGTON

November 30, 1959

MEMORANDUM FOR THE SECRETARY OF THE ARMY
THE SECRETARY OF THE NAVY
THE SECRETARY OF THE AIR FORCE
THE ASSISTANT SECRETARY OF DEFENSE (SUPPLY & LOGISTICS)

SUBJECT: Bureau of the Budget Bulletin 60-2 - Commercial-Industrial Activities Program.

The Director of the Bureau of the Budget, by direction of the President, has issued BoB Bulletin 60-2 which requires the review of all activities under the Commercial-Industrial Activities Program. The bulletin places emphasis on review of government owned and operated and government owned, or partly owned, and contractor operated activities, such as arsenals; shipyards; aircraft, ship and vehicle maintenance and repair; transportation, on a worldwide basis; communication; and warehousing and storage.

The Assistant Secretary of Defense ( Supply & Logistics) is hereby authorized to issue to the military departments the necessary instructions that will enable the Department of Defense to carry out the requirements of this bulletin.

The Secretary of the Army, the Secretary of the Navy and the Secretary of the Air Force are hereby authorized to act for the Secretary of Defense in making decisions to continue, discontinue or curtail within their respective departments the activities covered by this program in accordance with the provisions of the Bureau of the Budget 60-2 and the instructions to be issued by the Assistant Secretary of Defense ( Supply and Logistics). Redelegation to the Assistant Secretaries for Materiel is authorized to make decisions for activities on an annual estimated cost or value of product of $1,000,000 or less.

Since the primary purpose of this program is to eliminate those activities which are producing a product or service which can be furnished by private enterprise, it is requested that the Secretary of each Military Department take necessary action to evaluate all such activities on an organized basis and eliminate those which are no longer necessary or the purpose of which has become obscure. This program provides an excellent opportunity to re-direct future Department of Defense expenditures for such activities to more urgent programs and to strengthen the mobilization base of private enterprise.

/signed/

THOMAS S. GATES
Deputy

55828 O—60——6

DEPARTMENT OF DEFENSE
ASSISTANT SECRETARY OF DEFENSE
WASHINGTON

PA November 30, 1959

SUPPLY AND LOGISTICS

MEMORANDUM FOR THE SECRETARY OF THE ARMY
THE SECRETARY OF THE NAVY
THE SECRETARY OF THE AIR FORCE

SUBJECT: Commercial and Industrial Activities Program - Bureau of the Budget Bulletin 60-2.

The Bureau of the Budget has issued a new Bulletin No. 60-2, dated September 21, 1959, which represents the Administration's policy and program with respect to commercial and industrial activities. This Bulletin is based upon a Cabinet decision at the meeting of April 24, 1959. It does not appreciably alter the basic policy expressed in Department of Defense Directive 4100.15, dated April 27, 1955. It does modify materially the emphasis that must be placed upon certain types of activities, as well as the manner in which the policy will be carried out.

As a consequence of this Bulletin, the Department of Defense is required to make evaluations and decisions on all government owned government operated plants and all government owned or partially owned contractor operated plants, with emphasis placed in the following major areas in which commercial and industrial activities exist:

a. Arsenals
b. Shipyards
c. Aircraft, ship and vehicle maintenance and repair
d. Transportation on a world-wide basis and all commercial activities within
   (1) Military Ship Transport Service
   (2) Military Air Transport Service
e. Communication
f. Warehousing and storage.

The Secretary of Defense by memorandum of November 30, 1959 implemented the program required by Bureau of the Budget Bulletin 60-2, issued necessary delegations to the Secretaries of the Army, Navy and Air Force and authorized this office to issue instructions to carry out the program.

Under the new regulation the Department of Defense must make an evaluation of the major activities on an individual case by case basis. Decisions to continue, discontinue or curtail an activity will be reported on the appropriate Bureau of the Budget form for transmittal to the Bureau of the Budget. Those activities which represent annually less than $250,000 estimated cost or value of product will be reported on Bureau of the Budget Form A which summarizes the decisions by standard industrial classification. Those activities representing more than $250,000 estimated value of product annually will require individual reports on Bureau of the Budget Form B. Each "new start" which took place from January 1957 through June 1959 will be reported on Bureau of the Budget Form C. Arrangements have been made with the Bureau of the Budget that June 30 will be substituted for July 31 in the Instructions which accompany the Bureau of the Budget forms. Latitude has also been obtained to modify the reporting dates of the Bureau of the Budget Bulletin.

There is attached a summary of cases reviewed and acted upon under the Department of Defense Commercial and Industrial Activities Program, from 1954 through June 30, 1959, as reported by the military departments. To the extent that these fall in the classification of less than $250,000 value of product, they should be summarized on Report Form A and submitted to this office by January 31, 1960 for transmittal to the Bureau of the Budget. Activities within this classification which have not been evaluated, as well as any additional activities incorporated as a consequence of the additional areas of emphasis referred to above, will not be included in the January 31, 1960 submission but will be reviewed and evaluated during the period March 31, 1960 through March 31, 1961. A report will be submitted following each quarter. The January 31, 1960 submission plus the four quarterly reports will represent complete coverage of the program in this classification. Bureau of the Budget Form A, Part II, will be used for these quarterly reports.

Attached is a summary of government owned and government operated and government owned or partially owned contractor operated establishments of the Department of Defense which was submitted in 1955 to the Bureau of the Budget as an inventory ("Inventory of Certain Commercial and Industrial Activities of the Government" Bureau of the Budget May 1956). For the most part these have not been evaluated, but the establishments have been identified. Reports for each of these activities which represent more than $250,000 value of product shall be submitted by February 29, 1960 and include all of the information required by Bureau of the Budget Form B, except the decisions called for in Question 6. The department should insert the term "Not Evaluated" under Question 6. This submission will serve as a new inventory. These activities will be scheduled for decision throughout the period March 31, 1960 - March 31, 1961. Those cases which are added to the program as a consequence of the increased coverage described above, or not previously submitted as a part of the inventory do not have to

be reported with the February 29, 1960 submission, but should be reported in "Not Evaluated" form by March 31, 1960. They will be evaluated during above period.

An important revision to the program is the policy that when continued government operation of an activity is determined for one of the compelling reasons of paragraph 3, Bureau of the Budget Bulletin 60-2, such operation should be at a reasonable level of efficiency and economy (paragraph 4B). Accordingly, consolidation of activities may be considered as a means of sustaining at an economic level of operation, activities falling within this category.

Decision to continue commercial-industrial type activities under this policy are not necessarily final authority. An activity may later be discontinued or curtailed as a result of decisions made under other Department of Defense programs such as budgetary review, maintenance policy, storage and warehousing policy, or transportation policy. A decision to discontinue an activiity under this program, however, will be final.

The Commercial and Industrial Activities Program does not affect established procedures for disposal of plant and equipment, but merely serves as the decision that the activity will not be continued in operation.

Whenever a commercial activity is operated exclusively as an integral part of the function of another commercial activity, it will be included with the evaluation of the major activity and need not be reported or acted upon separately. If, however, it produces for or serves other activities than the parent enterprise, or if it is a commercial activity that provides general support to the parent activity in its role as a base, command, installation, etc. it will be evaluated separately.

It is intended that all reviews will be completed by March 31, 1961. A review of activities of $250,000 value of product or more will not take place again until calendar year 1965 when a complete review will take place. Major changes in basic missions may cause the Secretary of Defense to advance this date. Individual activities may be reviewed as occasion or changing circumstances warrant. Activities less than $250,000 value of product will be rescheduled for review throughout each three year period following the calendar year 1960 review. Any new starts must be submitted to the Assistant Secretary of Defense (Supply and Logistics) for prior approval in accordance with existing directive. Any new policies incorporated in this memorandum will be made a part of a revised DoD Directive to be issued by March 31, 1960.

No reporting will be required on any activity which involves an equipment investment of less than $5,000, and a product or service with an approximate annual value of less than $25,000.00.

There is attached for information a summary of some of the more important aspects of the Bureau of the Budget Bulletin 60-2.

This memorandum does not apply to products or services provided primarily to the public or agency employees as called for in paragraph 10 of the Bureau of the Budget Bulletin 60-2. A review of these activities will be provided for by separate Instruction at a later date.

The Military Department should submit to this office by January 31, 1960 a memorandum which outlines its program to carry out the provisions of the Bulletin and these instructions.

The documentation required by this memorandum involves approvals and disapprovals. Therefore, no OSD Report Symbol is necessary.

/signed/

PERKINS McGUIRE
Assistant Secretary of Defense
(Supply and Logistics)

The following submission schedule is established for the Bureau of the Budget forms of BoB Bulletin 60-2.

FORM A: - Activities having a cost or value of product of less than $250,000. Submit two (2) copies.

PART I - Due January 31, 1960 - Covers all cases evaluated prior to June 30, 1959 and will be summarized by Standard Industrial Classification.

PART II - Due January 31, 1960 - Covers all cases evaluated since June 30, 1959 and will be summarized as in Part I. (The number of cases may be few in number).

PART II - Due March 31, 1960 - All cases added to the program as a consequence of the increase in scope, but not evaluated, will be summarized though "NE", meaning "not evaluated as yet" will be reported in the action columns.

PART II - Due the 15th of the month following each of the last three (3) quarters of the year 1960 and the first quarter of 1961, will summarize for each quarter the evaluation made.

FORM B: - Activities having a cost or value of product $250,000 or more. Submit three (3) copies.

PART I - Due January 31, 1960 - Individual reports will be prepared and submitted for activities evaluated prior to June 30, 1959.

PART II - Due February 29, 1960 - Individual reports for all activities reported as a part of the inventory submitted for the Bureau of the Budget as summarized in the "Inventory of Certain Commercial and Industrial Activities of the Government" Bureau of the Budget May 1956. Include all data except that called for in Question 6.

PART II - Due March 31, 1960 - Individual reports for all cases identified as covered by the program but for which reporting data had not been submitted in the 1955-56 inventory mentioned above, or reported in Form b, Part I. When decisions called for in Question 6 have not been made, "NE" will be inserted meaning "not evaluated".

PART II - Individual reports will be submitted throughout the period March 31, 1960 to March 31, 1961 for all cases included above except those covered by Part I. These should be submitted in triplicate as soon as decisions are made by the Assistant Secretaries of the Military Departments or recommended to the Assistant Secretary of Defense (Supply and Logistics).

FORM C: - Submit three (3) copies.

Due January 31, 1960 - all "new starts" during the period January 1957 through June 30, 1959, will be submitted on an individual reporting basis.

All proposed "new starts" regardless of size will be submitted on this form for Assistant Secretary of Defense (Supply and Logistics) approval.

SUMMARY OF IMPORTANT ASPECTS OF BoB BULLETIN 60-2, DATED SEPTEMBER 21, 1959 - COMMERCIAL-INDUSTRIAL ACTIVITIES PROGRAM

1. Clear Unfeasibility

Previous - As activities were evaluated and approved for continued government operation, they were retained in the program for periodic restudy.

New - The procedure now recognizes as being unfeasible for continued review under the program those activities (1) which are an integral function of the basic military mission, (2) where the product or service is not and will not be available from commercial sources in the foreseeable future, and (3) where commercial procurement is administratively impractical. These will be excluded from future reporting until such time as conditions may change.

2. Significant Activities.

Previous - Up to this time, 49 different categories representing approximately 1700 activities have been studied. These cover generally smaller activities.

New - Now the emphasis is to be placed on studying all commercial-industrial activities which are in being, with emphasis placed on those activities of greatest significance and budgetary impact, such as maintenance of aircraft and ground vehicles, warehousing and storage, communications, construction, utilities, arsenals, shipyards, transportation (world-wide) to include MATS and MSTS, and similar broad activities.

3. Government Owned - Commercial Operated Activities.

Previous - Contract operators have been considered as commercial suppliers, and not previously reviewed.

New - The Bureau of the Budget now feel that incumbent commercial operators may have some advantages, which could restrict free commercial competition, and requires their survey and evaluation under the program.

4. Substantial Savings to the Government

Previous - Availability of the product or service from commercial suppliers at a competitive price has been the criterion.

New - The policy now recognizes that government operation of activities may be justified if procurement from commercial sources would result in substantially and disproportionately larger costs.

5. Production Primarily for the Public or Agency Employees

Previous - Activities for the above have not been considered as within this program.

New - These are now required to be kept under constant review and evaluation by the Department of Defense without submission to the Bureau of the Budget. This would include such activities as Post and Naval Exchanges, commissaries, etc.

6. Level of Operation

Previous - Where a government operation was justified under the criteria, its level of operation was usually held to the minimum necessary to support the national defense, to reduce competition with private suppliers.

New - The procedure now recognizes an economic level of operation, either break-even or better, as advisable where an activity is necessary for the defense.

7. Transportation.

Previous - Study was limited to the area now covered by the 50 States.

New - Transportation, world-wide is now within the program for study and evaluation. This will include MATS and MSTS. (Other types of activities are within the 50 States only.)

8. Economic and Social Aspects of Public Policy

Previous - Not formally stated.

New - In evaluation, prior to decisions on specific activities, we must consider the effect of our decision on the community, its residents and the specific employees, even though such aspects may not be the immediate responsibility of the Department of Defense.

9. Delegation of Authority

Previous - Delegation to discontinue, curtail or to continue has been made to the military departments, not to include approval of new starts.

New - The Secretary of Defense is now authorized to make delegations to other officials within his agency, for decisions on activities having an annual output of product or service up to $1 million. No delegation may be made to the official immediately responsible for operation of an activity. The action officer is required to sign each decision.

10. New Starts.

Previous - No formal report to the Bureau of the Budget has been in effect.

New - The Bureau of the Budget now sets up a reporting requirement by category, location, size, reason for approval, etc. Activities regardless of size are included.

11. Reports

Previous - No formal reporting procedure to the Bureau of the Budget has been in effect.

New - Report procedures are now formalized, and will be submitted to the Bureau of the Budget.

a. Summarized by Standard Industrial Classification for activities with an annual value of product under $250,000;

b. As individual reports for activities with an annual value of product over $250,000; and

c. As individual reports for all new starts from January 1957 through July 1959.

**EXECUTIVE OFFICE OF THE PRESIDENT**
**BUREAU OF THE BUDGET**
**WASHINGTON 25, D. C.**

BULLETIN NO. 60-2 September 21, 1959

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Commercial-industrial activities of the Government providing products or services for governmental use

1. Purpose. The purpose of this Bulletin is (a) to clarify the application of existing policy regarding competition between the Government and private enterprise in the light of executive branch experience under Bureau of the Budget Bulletins No. 55-4 of January 15, 1955, and No. 57-7 of February 5, 1957, and (b) to provide for the evaluation of all commercial-type enterprises not previously reviewed. To make this program more manageable, procedures have been designed to simplify reporting and to permit agencies to direct their major attention to those activities of greatest significance and budgetary impact.

2. Policy. It is the general policy of the administration that the Federal Government will not start or carry on any commercial-industrial activity to provide a service or product for its own use if such product or service can be procured from private enterprise through ordinary business channels. 1/

3. Exceptions. Because the private enterprise system is basic to the American economy, the general policy establishes a presumption in favor of Government procurement from commercial sources. This has the twofold benefit of furthering the free enterprise system and permitting agencies to concentrate their efforts on their primary objectives. However, in specific situations certain factors may make it necessary or advisable for a Government agency to produce goods or

1/ "Commercial-industrial activity...for its own use" includes the provision of services or products primarily for the use of a Government agency (whether the providing agency or other agencies), but excludes, for the purpose of this Bulletin, activities producing a service or product primarily for the public or agency employees. Also excluded are functions which are a part of the normal management responsibilities of a Government agency or a private firm of comparable size (such as accounting, personnel work, and the like). In determining whether an activity is "commercial-industrial" in nature and "can be procured from private enterprise through ordinary business channels," reference may be made to the Standard Industrial Classification Manual (available from the Superintendent of Documents, U.S. Government Printing Office). Additional information about both source and ability of private enterprise to provide a product or service may be secured from the Business and Defense Services Administration of the Department of Commerce.

services for its own use. In these situations the burden of proof lies on the agency which determines that an exception to the general policy is required. A finding must be made that there are compelling reasons for Government provision of a product or service before an exception is authorized. All relevant factors must be taken into account, including pertinent economic and social aspects of public policy, even though they may not be the immediate concern of the agency or official directly responsible for the particular activity.

Compelling reasons for exceptions to the general policy include national security; relatively large and disproportionately higher costs; and clear unfeasibility. Each of these is discussed below.

A. National security. "National security" as a compelling reason for continued Government ownership and operation of an activity is not meant to be all inclusive of all products or services with restricted classifications. Commercial contractors operating under proper security clearances and safeguards have been, and should continue to be, essential to the national defense effort. There are instances, however, when for reasons of national security, an activity cannot be turned over to private industry. These activities may include, but are not necessarily limited to, functions which must be performed by Government personnel in order to provide them with vital training and experience for maintaining combat units in readiness.

B. Costs. Continuation of Government operation on the ground that procurement through commercial sources would involve higher costs may be justified only if the costs are analyzed on a comparable basis and the differences are found to be substantial and disproportionately large. In such cases, the costs of both Government operation and private procurement must be fairly computed and complete. The costs assigned to Government operation must cover all direct and indirect outlays, such as pay and other allowances for personal services and leave; contributions for retirement and disability; supplies; materials; transportation; warehousing; utilities; maintenance; repairs, and similar factors. Appraisal of elements not usually chargeable to current appropriations, such as depreciation, interest on the Government's investment,2/the cost of self-insurance (even though it is unfunded),

2/ Initial costs may be used for determining the value of the Government's investment. However, if the initial costs are no longer valid for purposes of a cost analysis, the estimated current fair market value may be used instead.

After having determined the value of the Government's investment in the activity, the interest cost should be computed by using the current average market yield of outstanding marketable obligations of the United States having maturities comparable to the useful life of the item.

and exemption from Federal, State, and local taxes 3/ must also be made to the extent necessary to put the costs on a comparable basis. On the other hand, costs attributed to procurement from private sources must be computed on an equally fair and complete basis. They should be truly representative of the lowest price the Government would pay for the quantity and quality needed, taking into account all applicable costs of the Government for such procurement, and costs of handling and delivery.

The admissibility of relatively large and disproportionately higher costs as a possible compelling reason for continued Government operation does not alter the general policy which establishes a presumption in favor of Government procurement from commercial sources and does not prohibit procurement from more costly commercial sources. For instance, it may be found to be in the public interest to purchase the product or service, regardless of cost factors, in order to foster or maintain the development or growth of commercial production capabilities to meet ultimate governmental and non-governmental needs at potentially lower costs.

The existence of Government-owned capital assets is not in itself an adequate justification for the Government to provide its own goods or services. The need for continued Government ownership or operation must be fully substantiated. In many instances, evaluation may show that excessive operating costs, obsolescence, replacement costs, or low rates of utilization make continued Government operation unwarranted and liquidation of the asset preferable. Similar examination should be made of any reasons that tend to substantiate a compelling need for continued Government ownership and operation. Even the operation of a Government-owned facility by a private organization through contractual arrangement does not automatically assure that the Government is not competing with private enterprise. This type of arrangement could act as a barrier to the development and growth of competitive commercial sources and procurement through ordinary business channels.

C. Clear unfeasibility. Certain products or services may be found to be clearly unfeasible to procure from private enterprise through ordinary business channels due to the fact that the product or service is:

(1) An integral function of the basic mission of the agency, or

(2) Not available in the particular instance, nor likely to become available commercially in the foreseeable future because of

3/ Benchmarks for estimating taxes may be obtained from Tables 1 and 3, Statistics of Income 1956-1957, Corporation Income Tax Returns, Publication No. 16, U.S. Treasury Department, Internal Revenue Service.

the Government's unique or highly specialized requirements or geographic isolation of the installation, or

(3) Administratively impractical to contract for commercially.

4. Scope of evaluation. Each agency shall:

A. Make an evaluation and report of all its commercial-industrial activities not evaluated under Bureau of the Budget Bulletins No. 55-4 or 57-7. This should include activities which are Government-owned, contractor-operated and those which were established after December 1956.

B. Report the current status of those activities which were evaluated previously under Bulletin No. 55-4 or 57-7, including new starts established prior to December 31, 1956.

To permit speedy evaluation of commercial-industrial activities warranting detailed review and analysis, agencies may indicate their intention to eliminate from all extensive evaluation those activities which must be continued, in whole or in part, because it is clearly unfeasible to procure the products or services from private enterprise through ordinary business channels as defined in paragraph 3C.

When continued Government operation of an activity is determined to be mandatory in the public interest because of one of the compelling reasons enumerated in paragraph 3, such operation should be at a reasonable level of efficiency and economy.

5. Prompt and orderly action in termination or curtailment. Activities which are not authorized as an exception to the general policy because of a compelling reason should be discontinued as soon as reasonably possible. Similarly, activities which are to be curtailed should have their operations reduced as speedily as possible.

Each agency should exercise diligence in carrying out such actions in an orderly way and should proceed on a reasonable time schedule. Adequate notice should be given to the community and employees in advance of discontinuance or curtailment, and each agency should assist employees as necessary in finding other employment. Where statutory changes would be necessary to permit discontinuance or curtailment, the agency head should seek such changes promptly, submitting drafts of legislation or appropriation language, as may be required, to the Bureau of the Budget in the usual manner.

6. Steps to be taken before establishing new activities. No new commercial-industrial activity shall be started until the responsible official has made a formal finding for the record that, due to one of the compelling reasons stated in paragraph 3, Government provision of the product or service is in the public interest. Proposed starts

should be subjected to the same review outlined in this Bulletin for the evaluation of existing activities. 4/

7. Reports. The forms are designed for the evaluation of existing and newly established activities not evaluated previously, and to serve as a basis for review of the current status of activities evaluated previously under Bulletins No. 55-4 or 57-7. Instructions for subsequent progress reports will be issued at a later date. It is intended that future reporting will be limited generally to activities: (a) whose status has changed since their previous evaluation; (b) for which substantiating data on agency determinations have been requested by the Bureau of the Budget; or (c) which have been newly established since July 31, 1959.

Three types of reports are to be submitted. Paragraphs 7A and 7B apply to commercial-industrial activities established prior to December 31, 1956. The total number of installations and activities in these summary and individual reports should equal the total number of installations and activities listed in the Inventory of Certain Commercial-Industrial Activities of the Government, 5/ plus those new starts previously reported to the Bureau of the Budget in accordance with Bulletin No. 57-7. Any differences should be explained.

Those commercial-industrial activities established during the period of January 1957 through July 1959 are discussed in paragraph 7C.

A. Summary evaluation reports of actions and decisions to discontinue, curtail, or continue commercial-industrial activities will be made according to Exhibit 60-2A (copy attached), if the annual estimated cost or value of the product or service is less than $250,000.

Part I applies to activities previously evaluated in accordance with Bureau of the Budget Bulletins No. 55-4 or 57-7. Part II applies to activities newly evaluated in accordance with Bureau of the Budget Bulletin No. 60-2.

B. Individual evaluation reports of actions and decisions to discontinue, curtail, or continue commercial-industrial activities will be made according to Exhibit 60-2B (copy attached), if the annual estimated cost or value of the product or service is $250,000 or more.

Part I applies to activities previously evaluated in accordance with Bureau of the Budget Bulletins No. 55-4 or 57-7. Part II applies to activities newly evaluated in accordance with Bureau of the Budget Bulletin No. 60-2.

4/Establishment of new activities includes the establishment, acquisition, or reactivation of any commercial-industrial activity, regardless of the annual estimated cost or value of the product or service.

5/Issued by the Bureau of the Budget in May 1956.

C. Individual reports of commercial-industrial activities established from January 1957 through July 1959, regardless of the annual estimated cost or value of the product or service, will be made according to Exhibit 60-2C (copy attached).

Two copies of each report shall be submitted to the Bureau of the Budget on or before December 31, 1959. Negative reports should be submitted if appropriate. Detailed substantiating data need not be submitted, but the agency should be prepared to justify its findings.

No reports need be submitted for activities, other than transportation, conducted outside the States of the Union and the District of Columbia.

Up to 50 copies of these report forms may be obtained from the Bureau of the Budget Publications Unit, code 113, extension 2333; if more copies are needed, the agencies should have them reproduced.

8. Delegation. The agency head may delegate to officials within his agency his responsibility for decisions and findings on activities with an annual estimated cost or value of product or service of $1,000,000 or less. In such cases, the one to whom such authority has been delegated must sign the report. No delegation may be made to the official immediately responsible for producing the product or service.

9. Dissemination of policy. The agency head should take appropriate steps to ensure that responsible officials in his agency are familiar with this Bulletin and with the need for continuing review and evaluation. When needed, agency heads shall develop and issue specific instructions and criteria to supplement this Bulletin.

10. Agency responsibility for continuing review. Although this Bulletin does not deal with products or services provided primarily to the public or agency employees, each agency shall keep such activities under continuing review and evaluation to determine if such products or services can be procured from private enterprise through ordinary business channels.

Similarly, although this Bulletin calls only for action and reports on certain commercial-industrial activities conducted by the Government for its own use, agencies are expected to review all commercial-industrial activities on a continuing basis.

By direction of the President:

MAURICE H. STANS
Director

Attachments

Attachment A
To Bureau of the Budget
Bulletin No. 60-2

INSTRUCTIONS FOR SUMMARY EVALUATION REPORT (EXHIBIT 60-2A) FOR ACTIVITIES WITH AN ANNUAL ESTIMATED COST OR VALUE OF PRODUCT OR SERVICE OF LESS THAN $250,000

Part I is to be used for those activities evaluated under Bulletins No. 55-4 or 57-7. If the status of these activities is unchanged from the reports previously submitted to the Bureau of the Budget, it will not be necessary to reevaluate them. When former evaluations are found to be obsolete, current reviews should be made under the criteria of Bulletin No. 60-2.

Part II of Exhibit 60-2A is for those commercial-industrial activities not previously evaluated and which are to be reviewed in accordance with Bulletin No. 60-2.

Each part of the report should be clearly identified by checking the appropriate square. There should not be more than one part on a single sheet and a new form should be used for the next part's activities. When a part is completed, the totals for columns 1, 3, and 4 should be shown. The total number of activities and installations evaluated in parts I and II, when added to those individually reported in Exhibit 60-2B, should equal the total number of activities and installations listed in the Inventory of Certain Commercial-Industrial Activities of the Government (issued by the Bureau of the Budget in May 1956), plus those new starts previously reported to the Bureau of the Budget in accordance with Bulletin No. 57-7. Any differences should be explained.

Each part of Exhibit 60-2A is further divided into two sections: Section 1 applies to Government-operated activities and section 2 applies to activities which are Government-owned, contractor-operated.

In addition to checking the appropriate square on each form, the pertinent agency identification should be inserted at the top of the form. Data given should be as of July 31, 1959. All entries on this summary form should be as concise as possible. Detailed substantiating data need not be included, but the agency should be prepared to justify its findings. The reverse side of this form should be used if necessary for sections 1 and 2.

Specific instructions for each column follow:

Section 1 (Government-operated activities):

Columns 1 and 2 — If the activity is listed in the Inventory of Certain Commercial-Industrial Activities of the Government, use the same code number and title. If the activity is not listed, use

the code number and title from the Standard Industrial Classification Manual * which best describes the function performed. A brief description of the activity should be included if it is not adequately described in the Standard Industrial Classification Manual. All activities which are subordinate to, and operated solely for a major activity, are to be considered as part of that major activity.

Column 3 — Agency action actually completed for each activity should indicate the number of installations discontinued if the activity has been terminated and the facilities disposed of; curtailed if the volume of operation has been reduced but will continue; continued if the volume of operation has not been terminated or reduced, or other action taken with appropriate explanatory comment.

Example: An agency is listed in the Inventory of Certain Commercial-Industrial Activities of the Government as having a certain activity at fourteen installations. Actually, however, as of July 31, 1959, six of these installations had been discontinued; three were curtailed, and five were still being continued at the same level of operation. The entry in column 3 would be:

| | |
|---|---|
| Disc | 6 |
| Curt | 3 |
| Cont | 5 |
| Total | 14 |

Column 4 — Where action is pending, the specific action planned and the month and year it is to be completed should be entered in this column. Those activities which have actually been discontinued or curtailed as recorded in column 3, should not be entered in column 4.

In following the example cited above for column 3, of the five installations continued as of July 31, 1959, it is planned to discontinue two by January 1960; curtail one by December 1959; curtail another one by June 1960 and continue one indefinitely. The entry in column 4 would be:

| | | |
|---|---|---|
| Disc | 2 | 1/60 |
| Curt | 1 | 12/59 |
| Curt | 1 | 6/60 |
| Cont | 1 | |
| Total | 5 | |

Column 5 — This item need not be completed if the activity is to be discontinued at all installations as shown in columns 3 or 4. If, however, a determination has been made to continue or curtail an activity at one or more installations, or to make other exceptions to the general policy, the compelling reasons for continued Government operation should be given in the following terms: national security; increased costs

* Available from the Superintendent of Documents, U.S. Government Printing Office.

(increased costs must be relatively large and disproportionately high in accordance with paragraph 3B of Bulletin No. 60-2), or clearly unfeasible. The specific reason the product or service is clearly unfeasible to procure from private enterprise through ordinary business channels should be cited from paragraph 3C of Bulletin No. 60-2, e.g., basic mission; unavailable; or administratively impractical.

Thus, in the above example, the compelling reasons should be stated in column 5 for the three installations already curtailed (column 3); the two to be curtailed (column 4), and the one to be continued (column 4) as follows:

| | |
|---|---|
| National security | 3 |
| Increased Costs | 2 |
| Unfeasible -- Unavailable | 1 |
| Total | 6 |

Section 2 (Government-owned, contractor-operated activities):

Columns 1-5 -- Fill out in the same manner as indicated above for columns 1-5 under section 1.

Column 6 -- Indicate total value of capital assets. This figure should equal the total value (initial costs) of the buildings, real property and equipment. If available, the estimated current fair market value should also be included.

Column 7 -- Indicate as an approximate percentage the degree to which the facility is being operated compared to its capacity.

Column 8 -- Indicate the estimated annual cost of the operation to the agency, or the estimated value of the product or service.

EXHIBIT 60-2A

SUMMARY EVALUATION REPORT OF COMMERCIAL-INDUSTRIAL ACTIVITIES WITH AN ANNUAL ESTIMATED COST OR VALUE OF PRODUCT OR SERVICE OF LESS THAN $250,000

☐ PART I. ACTIVITIES PREVIOUSLY EVALUATED IN ACCORDANCE WITH BUREAU OF THE BUDGET BULLETINS NO. 55-4 or 57-7

☐ PART II. ACTIVITIES NEWLY EVALUATED IN ACCORDANCE WITH BUREAU OF THE BUDGET BULLETIN NO. 60-2

Agency _____ Bureau or subdivision _____

Additional information will be supplied by:

Name: _____ Approved by: (sign) _____

Title: _____ Tel.No. _____ Title: _____

Section 1. Government-operated activities: Date: _____

| Standard Industrial Classification Manual | | Agency Determination | | Compelling reason(s) that Government provision is in the public interest. |
|---|---|---|---|---|
| Code (1) | Title and/or description (2) | Action Taken (3) | Action Planned (4) | (5) |
| | | | | |

(Use reverse side if necessary)

EXHIBIT 60-2A

Agency: _____ Bureau or subdivision: _____

Section 2. Government-owned, contractor-operated activities:

| Standard Industrial Classification Manual | | Agency Determination | | Compelling reason(s) that Govt. provision is in the public interest | Capital assets (in 1,000) | Production | |
|---|---|---|---|---|---|---|---|
| Code | Title and/or description | Action Taken | Action Planned | | | % Capacity utilized | Annual Cost or Value (in 1,000) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | | | | | | | |

Attachment B
To Bureau of the Budget
Bulletin No. 60-2

INSTRUCTIONS FOR EVALUATION REPORT (EXHIBIT 60-2B) OF INDIVIDUAL ACTIVITIES WITH AN ANNUAL ESTIMATED COST OR VALUE OF PRODUCT OR SERVICE OF $250,000 OR MORE

Part I is to be used for those activities evaluated under Bulletins No. 55-4 or 57-7. If the status of these activities is unchanged from the reports previously submitted to the Bureau of the Budget, it will not be necessary to reevaluate them. When former evaluations are found to be obsolete, current reviews should be made under the criteria of Bulletin No. 60-2.

Part II of Exhibit 60-2B is for those commercial-industrial activities not previously evaluated and which are to be reviewed in accordance with Bulletin No. 60-2.

Each part of the report should be clearly identified by checking the appropriate square. There should not be more than one part on a single sheet and a new form should be used for the next part's activities. The total number of activities and installations evaluated in parts I and II, when added to those summarized in Exhibit 60-2A, should equal the total number of activities and installations listed in the Inventory of Certain Commercial-Industrial Activities of the Government (issued by the Bureau of the Budget in May 1956), plus those new starts previously reported to the Bureau of the Budget in accordance with Bulletin No. 57-7. Any differences should be explained.

In addition to checking the appropriate square on each form to indicate the applicable part, pertinent agency identification should be inserted at the top of the form. Data given should be as of July 31, 1959.

Specific instructions for each numbered item are as follows:

1. If the activity is listed in the Inventory of Certain Commercial-Industrial Activities of the Government, use the same code number and title. If the activity is not listed, use the code number and title from the Standard Industrial Classification Manual * which best describes the function performed. All activities which are subordinate to, and operated solely for a major activity, are to be considered as part of that major activity.

2. Briefly describe the activity if it differs appreciably from the description contained in the Standard Industrial Classification Manual.

3. Identify the city, area, state, or other geographical location of the activity.

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* Available from the Superintendent of Documents, U.S. Government Printing Office.

4. Check to indicate whether the activity is Government-operated or Government-owned, contractor-operated.

5. The estimated size of the activity as of July 31, 1959 is to be furnished as follows:

a. The total number of man-years should equal the total of civilian and non-civilian man-years, including contract employees if the activity is contractor-operated. The total labor costs should likewise equal the costs of civilian and non-civilian personnel. Where non-civilians are used, indicate the type, such as uniformed service personnel, inmates, patients, or contract.

b. Insert the annual cost or value of supplies and materials used.

c. The total annual cost or value of product or service should equal the total for a and b above.

d. Data for capital assets are required only if the activity is Government-owned, contractor-operated. Initial costs should be given, and if available, the estimated current fair market value should also be included in the appropriate column. Also indicate as an approximate percentage the degree to which the facility is being operated compared to its capacity.

6. Agency determination, based on its evaluation, should be given as follows:

a. Check "Discontinue" if the activity is to be terminated and the facilities disposed of; "Curtail" if the volume of operation is being reduced but will continue; "Continue" if the volume of operation is not to be terminated or reduced, or "Other" with appropriate explanatory comment.

b. Indicate the effective date the action was taken or is planned to be taken.

7. If it has been determined to curtail or continue the activity, or to make other exceptions to the general policy, the compelling reasons for continued Government operation should be given in the following terms: national security; increased costs (increased costs must be relatively large and disproportionately high in accordance with paragraph 3B of Bulletin No. 60-2), or clearly unfeasible. The specific reason the product or service is clearly unfeasible to procure from private enterprise through ordinary business channels should be cited from paragraph 3C of Bulletin No. 60-2, e.g., basic mission, unavailable, or administratively impractical.

Detailed substantiating data need not be included, but the agency should be prepared to justify its findings.

8. Remarks, recommendations, or other comments are invited.

EXHIBIT 60-2B

EVALUATION REPORT OF INDIVIDUAL ACTIVITIES WITH AN ANNUAL ESTIMATED COST OR VALUE OF PRODUCT OR SERVICE OF $250,000 OR MORE

☐ PART I. ACTIVITIES PREVIOUSLY EVALUATED IN ACCORDANCE WITH BUREAU OF THE BUDGET BULLETINS NO. 55-4 or 57-7

☐ PART II. ACTIVITIES NEWLY EVALUATED IN ACCORDANCE WITH BUREAU OF THE BUDGET BULLETIN NO. 60-2

_____ _____
Agency Bureau or subdivision

Additional information will be supplied by: Approved by:(sign) _____

Name: _____ Title: _____

Title: _____ Tel.No._____ Date: _____

1. Activity code number and title as stated in the Standard Industrial Classification Manual:

2. Brief description of the activity if it is not described adequately in this manual:

3. Location of the activity: _____ _____
City or area State

4. Activity is Government operated ☐ or Government-owned, contractor-operated ☐

5. Estimated size of the activity as of July 31, 1959 (dollars in thousands):

| | Number | Cost or value |
|---|---|---|
| a. Civilian man-years | _____ | $_____ |
| Non-civilian man-years | _____ | _____ |
| TOTAL | _____ | $_____ |
| Type of non-civilians _____ | | |
| b. Supplies and materials used | | $_____ |
| c. TOTAL ANNUAL COST OR VALUE OF PRODUCT OR SERVICE: | | $_____ |

d. Capital assets (required only if Government-owned, contractor-operated):

| | Initial Cost | Estimated current fair market value |
|---|---|---|
| Buildings and real property | $_____ | $_____ |
| Equipment | _____ | _____ |
| TOTAL CAPITAL ASSETS | $_____ | $_____ |

Percent capacity utilized _____

6. Agency Determination:

   a. Discontinue ☐ Curtail ☐ Continue ☐ Other _____ (Specify)

   b. Effective date the action was taken or is planned to be taken _____

7. If the activity is not to be discontinued, indicate the compelling reason(s) why an exception to the general policy is warranted:

8. Remarks:

Attachment C
To Bureau of the Budget
Bulletin No. 60-2

INSTRUCTIONS FOR EVALUATION REPORT (EXHIBIT 60-2C) OF INDIVIDUAL COMMERCIAL-INDUSTRIAL ACTIVITIES ESTABLISHED FROM JANUARY 1957 THROUGH JULY 1959

This form applies to all new commercial-industrial activities, regardless of annual estimated cost or value of product or service, established during the period from January 1957 through July 1959 (as defined in Bulletin No. 60-2, paragraph 6.).

The pertinent agency identification should be inserted at the top of the form. Specific instructions for each numbered item are as follows:

1. If the activity is listed in the Inventory of Certain Commercial-Industrial Activities of the Government (issued by the Bureau of the Budget in May 1956), use the same code number and title. If the activity is not listed, use the code number and title from the Standard Industrial Classification Manual * which best describes the function performed. All activities which are subordinate to, and operated solely for a major activity, are to be considered as part of that major activity.

2. Briefly describe the activity if it differs appreciably from the description contained in the Standard Industrial Classification Manual.

3. Identify the city, area, state, or other geographical location of the activity.

4. Check to indicate whether the activity is Government-operated or Government-owned, contractor-operated.

5. The estimated size of the activity as of July 31, 1959 and on the date it is contemplated to be in full operation (indicate such date) are to be furnished as follows:

a. The total number of man-years should equal the total of civilian and non-civilian man-years, including contract employees if the activity is contractor-operated. The total labor costs should likewise equal the costs of civilian and non-civilian personnel. Where non-civilians are used, indicate the type, such as uniformed service personnel, inmates, patients, or contract.

b. Insert the annual cost or value of supplies and materials used.

c. The total annual cost or value of product or service should equal the total for a and b above.

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* Available from the Superintendent of Documents, U.S. Government Printing Office.

d. The estimated current fair market value of the capital assets should be given. Also indicate as an approximate percentage the degree to which the facility is being operated compared to its capacity as of July 31, 1959, as well as when the activity will be in full operation.

6. The compelling reason(s) that Government provision of the product or service is in the public interest should be stated in the following terms: national security; increased costs (increased costs must be relatively large and disproportionately high in accordance with paragraph 3B of Bulletin No. 60-2), or clearly unfeasible. The specific reason the product or service is clearly unfeasible to procure from private enterprise through ordinary business channels should be cited from paragraph 3C of Bulletin No. 60-2, e.g., basic mission; unavailable, or administratively impractical.

Detailed substantiating data need not be included, but the agency should be prepared to justify its findings.

7. Indicate the date the activity was established.

8. Remarks, recommendations, or other comments are invited.

EXHIBIT 60-2C

EVALUATION REPORT OF INDIVIDUAL COMMERCIAL-INDUSTRIAL ACTIVITIES ESTABLISHED FROM JANUARY 1957 THROUGH JULY 1959

Agency _____ Bureau or subdivision _____

Additional information will be supplied by: Approved by:(sign) _____

Name: _____ Title: _____

Title: _____ Tel.No. _____ Date: _____

1. Activity code number and title as stated in the Standard Industrial Classification Manual:

2. Brief description of the activity if it is not described adequately in this manual:

3. Location of the activity: _____ (City or area) _____ (State)

4. Activity is Government operated ☐ or Government-owned, contractor-operated ☐

5. Estimated size of the activity (dollars in thousands):

| | July 31, 1959 | | Full operation Contemplated 19_ | |
|---|---|---|---|---|
| | Number | Cost or value | Number | Cost or value |
| a. Civilian man-years | | $ | | $ |
| Non-civilian man-years | | $ | | $ |
| TOTALS | | | | |
| Type of non-civilians _____ | | | | |
| b. Supplies and materials used | --- | | --- | |
| c. TOTAL ANNUAL COST OR VALUE | | $ | | $ |
| d. Capital assets | | | | |
| Buildings and real property | --- | $ | --- | $ |
| Equipment | --- | | --- | |
| TOTAL CAPITAL ASSETS | --- | $ | --- | $ |
| Percent capacity utilized | | | | |

6. Compelling reason(s) that Government provision is in the public interest:

7. Date activity established _____.

8. Remarks: (Use reverse side if necessary).

Mr. CRIST. The memorandum issued by the Secretary of Defense, dated November 30, 1959, provides that all decisions will be made by the Secretaries of the military departments. The Secretaries of the departments will review and make a decision on each activity that represents an estimated $1 million value of product or service annually. The Secretaries of the departments may redelegate to their respective Assistant Secretaries having materiel and logistical responsibilities, authority to review and make decisions in those activities of less than $1 million estimated annual value of product or service.

The Secretary of Defense has emphasized that the program represents an excellent oportunity to redirect future Department of Defense expenditures from activities which are no longer required, to more urgent programs.

Mr. STULTS. Mr. Crist, just for our information, you get a figure of $1 million for each activity. If each one of these 70 oxygen plants has under $1 million volume, would it not even be reviewed under Mr. McGuire's memorandum?

Mr. BUSCHMAN. That would mean that it would be reviewed by the Assistant Secretary of the Department for Materiel and no decisions will be made at any lower level than that. In other words, all decisions have been pulled up to the secretarial level. The Secretary has the full responsibility but he may employ the Assistant Secretary having a logistical responsibility to make the decision in any case under $1 million.

Mr. STULTS. Mr. Buschman, could you tell the committee that Mr. McGuire personally has approved the line item in the budget for 70 oxygen-producing plants?

Mr. BUSCHMAN. As I indicated under this review process, this is a decision for the departments, the Secretaries of the departments, and the Assistant Secretaries of the departments. The cases are not coming to the Office of the Secretary of Defense until after decisions are made by the departments under this review process.

Mr. STULTS. So, there would be no opportunity for Mr. McGuire even to look at this until—when?

Mr. BUSCHMAN. Well, in the case of new starts, they will be submitted to the Office of the Secretary of Defense.

Mr. STULTS. That is a new start, is it not?

Mr. BUSCHMAN. Yes. This is a new start.

Mr. STULTS. Has it been submitted to him?

Mr. BUSCHMAN. No. It has not been submitted, as such, until this case arose. Under the new policy all new starts will be submitted to the Assistant Secretary of Defense for Supply and Logistics. This has been a continuing procurement over the past 5 years, as you will see from the Department of the Air Force's testimony.

Mr. STULTS. I am not certain that you can say that the policy of the administration and the Bureau of the Budget just started with 60–2 last November, either, can you?

Mr. BUSCHMAN. No. that is true.

Mr. STULTS. Charles Thomas testified to this committee back in the fall of 1953 that this was the policy; so, presumably, it predated even the first liquid oxygen facility.

Now, did Mr. McGuire see and approve the issuance of bids for 70 liquid-oxygen-producing plants?

Mr. BUSCHMAN. No, sir. He did not see and approve the issuance of bids for the 70 liquid oxygen plants.

Mr. STULTS. Did Secretary Dudley Sharp see them?

Mr. BUSCHMAN. That I couldn't answer.

Mr. CRIST. I think the Air Force can give you that.

Mr. STULTS. No one in the Office of the Secretary of Defense or anyone in the Office of the Assistant Secretary of Defense for Supply and Logistics saw or approved that?

Mr. BUSCHMAN. Not under the commercial industrial activties program. The item did come through, of course, as a line item, as was expressed by the Bureau of the Budget this morning, and would have gone through the Assistant Secretary of Defense for the Comptroller. Here it would be reviewed under the budgetary process as a line item.

Mr. STULTS. But it was not by your shop.

Mr. BUSCHMAN. Not by our procedures.

Mr. STULTS. Will it go under the new rules?

Mr. BUSCHMAN. Under the new rules, any action of this kind will be submitted, and, as you will see, we are obtaining an inventory covering any such activity as they exist and as they are proposed.

Senator BIBLE. Very well, Mr. Crist, you may continue.

Mr. CRIST. In the memorandum of the Assistant Secretary of Defense (Supply and Logistics) each department was requested to submit by March 31, 1960, an inventory covering all of the activities which had previously been covered by the program and all of the activities which would be covered as a consequence of the emphasis on major activities. In addition, the instructions provided that the review of each activity by the military departments will take place within the period from March 31, 1960, through March 31, 1961.

Inventory reports of the departments have been received and are in process of being tabulated. It is estimated that about 5,000 activities were reported by the departments. As soon as the résumé is completed, our staff will proceed with the departments, and the Bureau of the Budget, to program the review of the activities covered by the inventory.

As you may well understand, there are a number of activities which are known to be an integral function of the military departments. Certain types of aircraft maintenance and repair may be used as an example. The Strategic Air Command, as well as the Tactical Air Command and the Air Defense Command each maintain a level of operation maintenance and repair, consisting of uniform personnel, which relocate with the operational activity. We have obtained complete reports on typical cases in this particular area. It is clear that they are covered by the program and we have had listed every location in which such an activity exists. A decision will be made on all of these types of activities based on the sampling of cases. It is likely that we will not require a further review by the Department of the Air Force of such cases. However, they will be included in the statistics.

It is hoped that by reviewing the initial summary with the departments and the Bureau of the Budget, decisions can be made by the departments at approximately the same time on a given class of activity. In this way better staff coordination between the departments will be obtained.

We have indicated to you that decisions will be made in each activity by the Secretaries of the departments and that this will be carried out from the period March 31, 1960, through March 31, 1961. It is important to emphasize here that the major activities to be reviewed will be the most time consuming. It will be necessary in each case for the departments to accumulate considerable backup material if the respective Secretary is to make a proper decision. Probably both the largest number of cases, as well as the largest individual cases for which decisions will be made, will peak during the latter half of this 1-year period. Copies of all decisions are required to be made available to the Bureau of the Budget through the Assistant Secretary of Defense (Supply and Logistics).

The Secretaries of the departments will not report individual decisions in those cases under $250,000 estimated annual value of product or service. These are to be reported in summary form to the Bureau of the Budget. It is likely that this will represent the bulk of the activities in terms of numbers, though not in terms of the total annual value of product or service.

It is planned to review those activities under $250,000 every 3 years, following this initial review. These will represent the bulk of competition with small business. Those activities which exceed $250,000 estimated value of product or service will be reviewed every 5 years. Individual cases can be reviewed at any time, and, of course, the Secretary of Defense can at any time change the schedule.

Another element of this program is concerned with the review of new starts. New starts are defined as establishment of new activities, major expansions, or reactivations. New starts will continue to be reviewed as they occur. All new starts must be approved by the Assistant Secretary of Defense (Supply and Logistics).

The question has been raised from time to time as to the relative effect this review will have on the activities of the Department of Defense. It is impossible to give any specific answer. As far as individual cases are concerned, this office would not wish to prejudge a decision that ultimately must be made by the Secretary of the military department.

There is adequate authority contained in the implementing memorandums of the Secretary of Defense and the Assistant Secretary of Defense (Supply and Logistics), as well as considerable incentive to the departments, to discontinue activities which can better be performed by private enterprise and which may serve to strengthen the mobilization base of private enterprise.

On the other hand, adequate provision has been made in the Bureau of the Budget Bulletin and in the criteria of the Department of Defense directive that those activities that are needed by the departments can be continued. These include activities considered to be an integral function of the Department of Defense, as well as activities continued for national security reasons or for reasons of geographic location, or simply because it is administratively impractical to contract with private enterprise. In this connection there are many instances in which the Department of Defense has had to construct manufacturing facilities simply because private industry was not willing to risk investment of private funds in this activity. There was no way of determining that a specific item would continue to be the

one procured, and as a consequence, industry could not and would not risk their capital.

In our opinion, the program should have a very desirable effect on the economy as a whole. Facilities that do not serve to support the mission of the Department of Defense may be discontinued and disposed of. Others which do serve the needs of the Department of Defense but are obsolete or operating at uneconomical levels may actually be given a greater workload to perform and in the process be modernized. Overhead of the Department of Defense should be reduced thereby, permitting funds and action to be concentrated on the procurement of weaponry for modernized forces. Current procurement of goods and services that are to be supplied by private industry during an emergency will assist them in maintaining the know-how to do so, thereby strengthening the base of private enterprise. Similarly, the labor force will retain their know-how. The program should tend to reduce new investment in facilities by the Department of Defense, a very important consideration in light of the national debt structure. Facilities that are disposed of can be retained in the overall national industrial economy. The national security clauses placed on plants disposed of following World War II served this purpose very well. Such plants are likely to be utilized to a greater degree as a part of private enterprise than as a Government-owned facility, thereby serving the consumer-taxpayer far more. As a result they become a part of the tax base of local communities as well as to provide employment in the area.

In summary, it must be remembered that implementation of this policy will be carried out with consideration for the primary national security mission of the Department of Defense and with the application of sound judgment and prudent management by top-level people.

At this point in connection with part II, which deals with the 70 oxygen-generating plants, the prepared statement here, if you like, I will read and then I would like to present the representative of the Air Force who will present the Air Force's statement. Is this agreeable?

Senator BIBLE. Very well.

Mr. CRIST. Or would you prefer to deal with this 60–2 problem?

Senator BIBLE. I am very anxious to get the part II problem, so, you may read the opening statement. You have your Air Force well represented here, and can then let them take the stand and tell their story.

Mr. MESSICK. With your permission, Mr. Chairman, we would like to ask Mr. Crist and the Defense Department to update a list of reviewing activities conducted by the Air Force as of 1957. The list was submitted as an appendix to the hearings that the committee conducted at that time. It appears on page 86, and we would very much like to have that brought up to date in order to judge the progress of the programs since that time.

Mr. CRIST. May I ask you this, sir? We will submit to you a copy of the total inventory. There are some 5,000 activities that are reported. At this point I would like to know whether we should give you anything other than the latest review that has been made which relates to the 2,374 items. We have updated your 1957 figures there in this first submission which I have introduced and you accepted.

Senator BIBLE. We will let the staff take a look at that, and if this supplies the information, fine. If not, then they will be in touch with you. We will not take further time now.

Mr. CRIST. Thank you, sir.

In a letter dated April 11, 1960, Senator Sparkman requested an investigation of the Department of Air Force procurement of 70 oxygen-generating plants. A report has been transmitted to Senator Sparkman. The report indicates the Air Force need for these plants. The Strategic Air Command must be able to have oxygen-manufacturing facilities wherever they may locate and cannot rely solely upon commercial sources. Under peacetime conditions, the Department of the Air Force has made it a practice to procure approximately 50 percent of its oxygen requirement for personnel use even though it must and does maintain manufacturing capability. We cannot find any conflict with the commercial and industrial activities program, in connection with this procurement.

I have with me today, as previously mentioned a representative of the Air Force, who will present the Air Force statement on this procurement.

Senator BIBLE. Before you present them, your next to the last sentence, Mr. Crist, says:

> We cannot find any conflict with the commercial and industrial activities program in connection with this procurement.

Now, first, who is "we"?

Mr. CRIST. Well, I will have to put this in the context of this being supply and logistics, the Office of Production Policy, Mr. Buschman, my staff director, reviewed with his staff and with the Air Force people who are here today the data they submitted in connection with this procurement.

Senator BIBLE. Who specifically reviewed the procurement that Air Force was making for the 70 liquid-oxygen plants?

Mr. Buschman, are you the man?

Mr. BUSCHMAN. Yes.

Senator BIBLE. When did you meet with them?

Mr. BUSCHMAN. We first met with the Department of the Air Force in connection with a letter that Senator Gruening sent to us in the fall of 1959 on the procurement of the Alaskan Chemical Co. with the Alaskan bases there.

We reviewed this problem very, very carefully with the Air Force, and even——

Senator BIBLE. Who is "we" again? This is you and who else?

Mr. BUSCHMAN. This is myself, and Mr. Evans, a member of my staff. We reviewed it with the staff of the Air Force, that is, Mr. Carter, who is present with the Air Force representatives that are here.

Senator BIBLE. Now, you say you reviewed it very carefully. How did you review it?

Mr. BUSCHMAN. We went into the requirements. We requested the Department of the Air Force to submit what their actual experience was in producing liquid oxygen and procuring from the Alaskan Chemical Co. We finally, Mr. Carter and Mr. Evans, telephoned the commanding officers of the bases there and obtained information from the bases firsthand.

At this point it developed that they had procured 27,000 gallons of liquid oxygen from the Alaskan Chemical Co. during 1959, and the base at the same time informed us that there would be a procurement during 1960 which would approximately equal that amount of procurement from the company.

We expressed this in a letter to Senator Gruening and we assumed that the information was passed on to the company. The case then arose again recently as a consequence of inquires that were received both in the Department of the Air Force and by our own office from Senator Sparkman and from the Appropriations Committees of both the Senate and the House. This was a consequence of the many inquiries that the industries had sent to the many Senators, including yourself.

At this point, we held several meetings with the Department of the Air Force to study this further. We expedited our review of the case with them and went into the details of their requirement, how many of these plants that they were actually procuring, and came to the conclusion ourselves that the procurement was a justifiable one, that the Department of the Air Force had such a need.

We had them express this in a report to our office and then, in turn, transmitted that report by letter to both the Appropriations Committees and to Senator Sparkman.

Senator BIBLE. Well, is this an independent determination by you? Did you independently determine that in your considered judgment, the procurement of 70 liquid-oxygen plants was necessary?

Mr. BUSCHMAN. My facts and report were briefed in a memorandum to the Deputy Assistant Secretary who signed the transmittal letter to Senator Sparkman and, in effect, approved the action.

Senator BIBLE. You are the individual, you are the man who participated in these hearings, and you are the one who came to this conclusion; is that right?

Mr. BUSCHMAN. That is right.

Senator BIBLE. You, in turn, transmitted that conclusion to Assistant Secretary McGuire; is that correct?

Mr. BUSCHMAN. Actually, I believe Mr. LeBoutillier was acting as Assistant Secretary at the time, and transmitted this report. Mr. McGuire was not available at the time. He was out of town.

Senator BIBLE. And, then, from there where did it go? To the Secretary of Defense?

Mr. BUSCHMAN. From there—no. Mr. LeBoutillier had the authority to approve as the Acting Assistant Secretary of Defense, and transmitted it to your committee and transmitted it to both Appropriations Committees.

Senator BIBLE. He was authorized to put the stamp of approval on it insofar as Defense was concerned; is that what you are saying?

Mr. BUSCHMAN. Absolutely. Under our procedures, the Assistant Secretary of Defense for Supply and Logistics has this authority and the Deputy, of course, has the authority in his absence, or acting for him.

Senator BIBLE. Tell me this, Mr. Buschman—Do I have your name right, Mr. Buschman?

Mr. BUSCHMAN. Yes, sir; right.

Senator BIBLE. During the course of this discussion, first coming out of the Alaskan situation and then out of the broader procurement, did you give any thought to calling in the members of this industry to sit down and give you their side of the story and see if you could work this out within the framework of Defense and private industry?

Mr. BUSCHMAN. We did not call in the industry. We had, I might say, considerable correspondence that had been sent by industry to members of your committee and, in turn, to us. We had this to review, and our doors were wide open on the subject.

As a matter of fact, Mr. Johnson did visit us, and I believe Mr. Roberts visited us. We sat down and discussed the problem with them at that time. That is, they asked questions and gave us additional information.

Senator BIBLE. They asked whom, your shop or Air Force?

Mr. BUSCHMAN. They came to our office. They came to Mr. McGuire's office. He was not available at the time, and Mr. Crist, myself, and Mr. Holt, who is the executive assistant to Mr. McGuire, met with them in Mr. LeBoutillier's office, and discussed the entire question with them at that time. So, in that sense we had their advice and they had the opportunity to tell us anything that they wished to tell us at the time.

Senator BIBLE. Well now, before you sent your recommendation to the Acting Assistant Secretary of Defense, were you satisfied that the decision which had been made by the Air Force on recommended procurement for Air Force was a correct decision?

Mr. BUSCHMAN. Yes.

Senator BIBLE. You have heard the testimony——

Mr. BUSCHMAN. I would not have made it if I had not felt satisfied.

Senator BIBLE. Would you have the right of veto over it if you disagreed with them, if you said, no, you should continue to use private industry? Could you say that?

Mr. BUSCHMAN. I certainly would have said that to them and could have said that to them; yes.

Senator BIBLE. Has your opinion been changed any as a result of hearing the presentation of the members of the industry today?

I know you have heard them.

Mr. BUSCHMAN. Yes; I have been here from the outset of the testimony today. I have not heard anything which would cause me to change my opinion.

Senator BIBLE. Now, I think I have one more question, and then I will question the Air Force on this particular point.

You say there is nothing they offered today which would change the opinion and conclusion which you have reached.

Mr. BUSCHMAN. That is correct.

Senator BIBLE. Do you have a fixed opinion on this matter?

Mr. BUSCHMAN. Not at all. I think you will find that I am very flexible in my views and would keep them wide open.

Senator BIBLE. Well, I am glad to hear of that flexibility. Is there a possibility that—this problem seems to me to be one that certainly can be handled by sitting down around the table and having some basis of understanding and talking this back and forth.

Do you think that would be helpful at this time, to have the people of the industry in?

Mr. BUSCHMAN. Senator Bible, if anything was brought out that would cause us to change our minds, we certainly would do so. At this point we have not heard anything that in my judgment——

Senator BIBLE. One predicate for your point of view, without going down them one, two, three, four, five, six, was that this was not a production problem. This was a storage problem, that you could adequately store this as has been done in many, many bases.

Mr. BUSCHMAN. Well, as the problem has been presented to me, and as I see the facts, there is a real operational need here on the part of the Strategic Air Command planes. Liquid oxygen is something that is placed in a plane the moment it lands. It is as essential to the plane as the fuel itself. The plane cannot perform its mission or function unless it has the liquid oxygen.

Senator BIBLE. Have any of the bases had difficulty getting this liquid oxygen? Are you sure of this purpose?

Mr. BUSCHMAN. I think that most of these bases have the liquid oxygen facilities and I think that between the two, both the commercial source and the inhouse source, that they probably have received all the oxygen they need. But I think it is very important that 50 percent of the oxygen is being procured by private enterprise, and in this sense the Department of the Air Force has built into its system a two-edged sword in that they have protection both ways.

They are not dependent upon any one, single system in that sense. They have inhouse capability and they have commercial sources, both.

Senator BIBLE. Well, if you had adequate storage, wouldn't that take care of the problem?

Mr. BUSCHMAN. This I don't believe I can answer in this sense. I have heard several views, both expressed by the industry and expressed by technical personnel of the Department of Defense, not only in the Department of the Air Force.

I have heard our own technical personnel, whom we contacted at the time that the Alaskan Chemical case came up, technical personnel in the Department of the Army, in which they said the storage is a difficult problem in the sense that there are losses.

Now, I would submit and would assume that these losses perhaps take place in the transfers that take place. The Air Force in its operation withdraws relatively small quantities. It has to put small quantities in the plane. And in each instance, when it is putting the quantity in, as I understand the figures, they withdraw 22 gallons in order to put 20 gallons into a plane, because of the loss that does take place through evaporation and handling the oxygen.

Senator BIBLE. Do you have any background in the liquid oxygen field?

Mr. BUSCHMAN. No, I don't.

Senator BIBLE. You and I are certainly starting off from scratch. Whom do you rely on for your technical and expert advice when you say you rely on technical people to tell you about the storage problem?

Mr. BUSCHMAN. In this sense I must do the same thing you do, and that is talk to the technical personnel of the Air Force. We have——

Senator BIBLE. Who are the technical people in the Air Force with whom you discussed this problem?

Mr. BUSCHMAN. Well, in this particular case it is primarily through Mr. Carter and his contacts there. He is present. We also have a

Mr. Fred Bates in the Office of Assistant Secretary of Defense, Supply and Logistics, who is our man on the chemical industries and is a very able technician.

At the time we were discussing this problem early in the fall, or rather I should say late in the fall, we secured his advice and we received the same types of answers.

I might say——

Senator BIBLE. Is this in the nature of a continuing procurement? Someone used the words "continuing procurement" a few moments ago. Maybe Air Force should know about that.

Mr. BUSCHMAN. I think they will present that to you.

Mr. CRIST. I indicated a continuing procurement because in our investigation of this whole situation, this turned out to be the last procurement of a planned program which had been going on for several years, and so this particular lot of 70 liquid oxygen generating plants was merely a phasing out of something that has been in existence, much of which, I must admit, we were unaware of because it was primarily an operational situation in the Air Force.

Senator BIBLE. Do you people ever call in these Navy people? I was rather impressed by the man from the State of Washington who said that the Navy had tried this inhouse liquid oxygen production plant and had a pile up there at the taxpayers' expense. Then they found out they could get it cheaper from private industry than they could manufacture it themselves.

Did you ever call Navy in to see how they were coming along?

Mr. BUSCHMAN. I am sure you will find that the large aircraft carriers have plants and do produce liquid oxygen. They must.

Mr. STULTS. Do you think that is comparable? An aircraft carrier? Which private producer has a truck that will go out to an aircraft carrier? Does the Bremerton Navy Yard have a liquid oxygen plant?

Mr. BUSCHMAN. I couldn't answer that question.

Senator BIBLE. My understanding was, from the testimony, that they did have and they had abandoned it and substituted private enterprise for it. I just wondered if they checked this out with the other branches of the service. We hear of this constant rivalry. I just wondered if Air Force does talk over liquid oxygen problems with their component parts in the service.

Mr. BUSCHMAN. Well, I would have to assume that the Air Force would have to answer this question, the extent to which they carry on discussions, but normally I think you will find that there is an interrelationship among them.

Senator BIBLE. There is what?

Mr. BUSCHMAN. There is an interrelationship among technical staffs of the Departments. We find that they all know each other, and——

Senator BIBLE. This is helpful.

Do you have some questions, Senator Bartlett?

Mr. STULTS. Mr. Chairman, if I could just ask permission from you, as chairman, to have included in the record the letter of April 29, from Mr. LæBoutillier to Senator Sparkman, which transmitted to our attention a copy of the Air Force policy on onbase liquid oxygen generation.

Senator BIBLE. It may be understood that the April 29 letter referred to, with the accompanying exhibit, will be made a part of the record at this point.

(The information referred to follows:)

ASSISTANT SECRETARY OF DEFENSE,
SUPPLY AND LOGISTICS,
*Washington, D.C., April 29, 1960.*

Hon. JOHN J. SPARKMAN,
*Chairman, Select Committee on Small Business,*
*U.S. Senate, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in reply to your letter of April 11, 1960, with attached inquiry from the Independent Oxygen Manufacturers' Association, regarding equipment for generating liquid oxygen at Strategic Air Command bases.

Inquiries have been received on this matter, and the Department of the Air Force has furnished a statement outlining its policy and the reasons why the mobile generating equipment is necessary to support the deployment of squadrons in a war emergency. A copy is attached.

So that experienced personnel may be available to operate these generators in an emergency, it is necessary that they be operated for training purposes during peacetime. Requirements for liquid oxygen beyond that produced at an economic level will continue to be obtained from commercial sources.

In view of the above, this office feels that the Department of the Air Force statement of policy and the requirement for this capability is justified and is necessary to our defense posture.

We appreciate your interest in this program and will be glad to advise you if additional information is desired.

Sincerely,

PHILIP LEBOUTILLER, Jr.,
*Acting Assistant Secretary of Defense (Supply and Logistics).*

AIR FORCE POLICY—ON-BASE LIQUID OXYGEN GENERATION

A. AIR FORCE POLICY

(1) Basic Air Force policy of several years standing is that all bases assigned a war mission requiring liquid oxygen will have sufficient generating capability to meet the war requirement. Policy further provides that generators will be operated in peacetime to assure a constant state of serviceability and provide for peak personnel skill and proficiency.

(2) The foregoing is considered necessary because:

(*a*) Liquid oxygen is essential to modern military high altitude aircraft operations for crew breathing purposes. We must, therefore, to the maximum extent possible, have an assured supply for combat readiness.

(*b*) It cannot be stored for long periods of time without constant replenishment (our experience is that under the best of storage circumstances, daily losses of one-half to 1 percent of volume occur).

(*c*) Under conditions of war, commercial sources may either be destroyed or conditions of war will drastically curtail their ability to produce and deliver.

(*d*) Liquid oxygen requires specialized transport equipment (trucks and rail cars) which may themselves be substantially eliminated by conditions of war.

(*e*) A high degree of purity for breathing is required. Bases must be in a position to rapidly replenish any liquid oxygen found to have deteriorated beyond usable limits. In time of war this might not be possible from commercial sources, for reasons stated above.

(*f*) Liquid oxygen generators are complicated mechanisms. Unless personnel are trained and available and equipment ready prior to hostilities, there will not be time to assemble and train the required crews and commence production operations.

(*g*) Under wartime conditions, deployment of units with complete support, including liquid oxygen, will be required.

(*h*) Commercial corporations are subject to strikes and labor disruptions in both the fields of production and transportation. Complete reliance upon commercial sources combined with such an occurence could leave the Air

Force helpless at the most crucial times. Moreover, in time of an emergency, the importance of liquid oxygen to the defense effort could lead to those commercial sources not actually destroyed becoming prime objects of sabotage.

The foregoing are the primary reasons why we consider an on-base capability essential to our war potential.

B. APPLICABILITY OF BUREAU OF THE BUDGET BULLETIN 60–2

(1) Paragraph 3A of the above bulletin provides for exemption from reliance upon commercial sources for a vital military necessity for functions which must be performed by Government personnel in order to provide them with vital training and experience for maintaining combat units in readiness. It is felt that this necessity has been adequately covered in paragraph (*a*) above and needs no further elaboration here. In addition to personnel training, we are also providing for adequate equipment in a state of readiness. In short, in time of peace, we are preparing to wage the type of war that evaluation of all known and assumed capabilities of our potential enemies leads us to believe we may experience.

(2) Paragraph 3c of the above bulletin pertains to clear unfeasibility of obtaining products and service from commercial sources. It is believed that paragraph 3a above also indicates the reasons why complete dependence upon commercial sources for liquid oxygen related to war capability is not feasible.

As stated in paragraph (*a*) above, liquid oxygen generators at Air Force bases is not a new policy. Therefore, our plans to acquire additional generators does not mark a departure from our past actions. We are obtaining these generators to:

(*a*) Equip new bases that are just now being activated.

(*b*) Provide capability for units being dispersed in keeping with current war plans.

(*c*) Equip bases not previously equipped due to equipment shortages.

(*d*) Realine equipment to best suit the needs of individual bases.

(*f*) Replace equipment no longer considered economically reparable.

It should be noted that many of the bases scheduled to receive generators already have a capability. Allocating generators in these instances represents action to accomplish the purposes described in paragraphs (*b*), (*d*), and (*f*) above. Cognizance should also be taken of the fact that we do not desire to become completely self-sufficient insofar as liquid oxygen is concerned. Our only purpose is to assure that bases will be self-sufficient to the extent of being able to fulfill their wartime missions. We are currently procuring a substantial quantity of liquid oxygen Air Force-wide and for the foreseeable future do not envision any significant reduction.

We are not, therefore, establishing commercial facilities in competition with private business. On the basis of our needs, as stated above, our liquid oxygen generators are essential components of the weapon systems concerned. It should be noted that generators under consideration for procurement represent all current and foreseeable needs for such equipment.

Mr. STULTS. Now, Mr. Buschman has indicated that he prepared this letter for Mr. LeBoutillier's signature, and he has gone over it and been happy with it. There are (*a*) through (*h*) reasons:

(*a*) Liquid oxygen is essential to modern military high altitude aircraft operations for crew breathing purposes.

Is this commercially produced liquid oxygen or Air Force-produced liquid oxygen, or just plain liquid oxygen?

Senator BIBLE. Mr. Stults I believe is referring to the attachment to the letter of April 29, Mr. Buschman. That might help you follow it.

Mr. STULTS. 2(a) is, "Liquid oxygen is essential."

Mr. BUSCHMAN (reading):

Liquid oxygen is essential to modern military high altitude aircraft operations for crew breathing purposes. We must, therefore, to the maximum extent possible, have an assured supply for combat readiness.

This is the product itself, of course, regardless of its source of production.

Mr. STULTS (reading):

(*b*) It cannot be stored for long periods of time * * *

You have described in the Air Force policy that daily losses of one-half to 1 percent of volume occur. We have had as witnesses before this committee today both users and manufacturers of storage equipment who say that losses can be engineered down to zero with the use of a recompression, or their average loss on this airborne equipment was less than 2 percent a month. Were you aware of that fact when you subscribed to the Air Force statement?

Mr. BUSCHMAN. I was aware of the fact that there are developments that do make liquid oxygen—that it is possible to store liquid oxygen over long periods of time. I believe this equipment that they are speaking of, as I noticed on the display that they had, that it was Air Force equipment in itself. I assumed it was developed with the Air Force or procured by the Air Force from industry. In that sense I am not unaware of it.

Mr. STULTS. You didn't ask Linde or any other manufacturer of storage facilities about the losses under storage in today's containers?

Mr. BUSCHMAN. No. And I assumed that they are talking about storage facilities of the types that are probably used around missile operations as well.

Mr. STULTS (reading):

(*c*) Under conditions of war, commercial sources may either be destroyed or conditions of war will drastically curtail their ability to produce and deliver.

I looked through here but I didn't see that you said under conditions of war Air Force bases might be destroyed and Air Force liquid oxygen generators might be destroyed. Would that have been fair?

Mr. BUSCHMAN. I think it is fair to say that Air Force bases——

Mr. STULTS. Might be targets also.

Mr. BUSCHMAN. Would be very excellent targets. I think this has been brought out many times. If the Air Force base, of course, is destroyed, you have no need for liquid oxygen for anyone.

Mr. STULTS. (*d*) is about specialized transport equipment. This is true whether, presumably, you are making it on the base or off the base. You still have to go from the plant to the aircraft; is that correct?

Mr. BUSCHMAN. Yes. They have specialized equipment of some form between the supply and the aircraft.

Mr. STULTS. You don't run it through a rubber hose?

Mr. BUSCHMAN. To my knowledge, no.

Mr. STULTS (reading):

(*e*) A high degree of purity for breathing is required.

Is the Air Force liquid oxygen more nearly pure than the commercial liquid oxygen?

Mr. BUSCHMAN. I believe Mr. Roberts [3] indicated to me when he was discussing this that they do have a technique in the industry that grades liquid oxygen depending upon its use, that their instrumenta-

[3] William P. Roberts, Jr., assistant to the president and general manager, Southern Oxygen Co., Bladensburg, Md.

tion does channel it as they are producing it for one particular usage versus another particular usage, and that is the intent and purpose of the instrumentation that the industry was talking about this morning; is that true?

(Mr. Roberts nodded in the affirmative.)

Mr. STULTS. The testimony of the industry is that the purity is a factor of——

Mr. BUSCHMAN. 98.5.

Mr. STULTS. 99.5.

Mr. BUSCHMAN. 99.5.

Mr. STULTS. And that the private industry could supply it with purity for breathing.

Mr. BUSCHMAN. I believe the statement has been made to us that as far as the Air Force requirement is concerned, that it does take a higher degree of purity than the 99.5.

Mr. STULTS. Are these 70 units built to a higher specification than the commercial units that are in use today?

Mr. BUSCHMAN. That I could not possibly answer.

Mr. STULTS (reading):

**(f) Liquid oxygen generators are complicated mechanisms. Unless personnel are trained and available and equipment ready prior to hostilities, there will not be time to assemble and train the required crews and commence production operations.**

We have heard testimony here that the impact on at least some of these producers will be such that they will put trained operators out on the streets if the Air Force's policy to self-produce is carried through, and the country will lose a part of its mobilization base.

Did you consider that?

Mr. BUSCHMAN. Of course, we have indicated in our report that the Air Force is procuring 50 percent of its requirements——

Mr. STULTS. Fifty percent. But as Mr. Johnson pointed out, 50 percent might be really good in Texas if that bring up the average, but when, let us say, none of it is procured in Alaska, this puts a heavy——

Mr. BUSCHMAN. Obviously, the policy will be different in different bases.

Mr. STULTS. So one could not take an overall look and say, this is the way it will affect everyone.

**(g) Under wartime conditions, deployment of units with complete support, including liquid oxygen, will be required.**

Are these units mobile and deployable?

Mr. BUSCHMAN. The particular units they are purchasing for are not mobile. The unit that they have, the 1-ton unit, as I understand it, has wheels and skids. These units can be transported, but they are not considered mobile units as such.

Mr. STULTS. Do you have any idea how long it would take to knock down a plant, let us say, from one of these bases?

Mr. BUSCHMAN. I assume it would take some time to do so.

Mr. STULTS (reading):

**(h) Commercial corporations are subject to strikes and labor disputes.**

Do you know the record of labor unrest in the oxygen-manufacturing field?

Mr. BUSCHMAN. I would not have based my decision on that statement.

Mr. STULTS. We then have, it seems to me, some eight reasons given by the Acting Assistant Secretary of Defense in reply to a communication from Chairman Sparkman. It seems to me, from Mr. Buschman's answers, that these do not have any particular applicability to whether the Air Force should buy commercially or should self-produce.

I just wonder on which of those eight grounds you made the statement, sir, that—

> This office feels the Department of Air Force statement of policy is justified and is necessary to our defense posture.

Mr. BUSCHMAN. We have based our decision upon the entire statement that was made by the Department of the Air Force, plus the information that it has given to us in its meetings and the entire thing, weighing it as a whole, not in any one individual sentence that may be incorporated.

Senator BIBLE. Senator Bartlett, I wonder if you might not have some questions. They mentioned Alaska here.

Senator BARTLETT. Yes; I might have one or two, with your permission.

Unfortunately, I haven't been able to be in the hearing as much as I should have liked to, so some of my questions may have been asked before.

Seventy oxygen-generating plants are mentioned. Are any of those building now?

Mr. BUSCHMAN. Pardon?

Senator BARTLETT. Are any of those under construction now, or have any of them been constructed?

Mr. BUSCHMAN. That award has not been made. Now, there have been oxygen plants that are in existence, and the Air Force will give you the exact number of those that have been procured in earlier years.

Senator BARTLETT. That is exclusive of the 70?

Mr. BUSCHMAN. Yes. In other words, in addition. The 70 is the tail end of a procurement that has been going on for several years.

Senator BARTLETT. That is the number of plants you propose to build now?

Mr. BUSCHMAN. That is correct.

Senator BARTLETT. And at what cost?

Mr. BUSCHMAN. I don't know the exact cost of the procurement, but the Air Force will provide that.

Senator BIBLE. I think, Senator, the testimony will show—I don't know that this is the exact cost, but at least they have a line item in this year's budget for $7 million which they contemplate is to help defray the cost, a portion of it.

Mr. BUSCHMAN. A portion of the 70 are to be procured from the fiscal year 1960 funds, and a portion from the fiscal year 1961 funds, but the Air Force will go into that in detail.

Senator BARTLETT. Some of the money was appropriated for the 1960 fiscal year?

Mr. BUSCHMAN. Yes, sir.

Senator BARTLETT. Now, it is said that the Air Force has made it a practice to procure approximately 50 percent of its oxygen requirements for personnel use even though it must and does maintain manufacturing capacity. How long has that practice been in effect?

Mr. BUSCHMAN. I would say several years.

Senator BARTLETT. Some of the places where your 70 plants are to be built are perhaps without Air Force plants now?

Mr. BUSCHMAN. That is correct.

Senator BARTLETT. All right. What I would like to ask there: What comes upon the scene in 1959, 1960, whenever the decision may have been reached, that persuaded the Air Force and the Department of Defense that all these additional plants must be built for national security?

Mr. BUSCHMAN. Let me state first that there are 200-some-odd plants that have been procured over the past 5 years and the specific figure again will be given you by the Department of the Air Force.

So that there is no decision within the past year that they should suddenly convert to manufacturing their own oxygen. This is a practice that has been going on for some years.

Senator BARTLETT. Let us say 5 years ago. How did the Air Force get along before then?

Mr. BUSCHMAN. I think they will have to answer that question.

Senator BARTLETT. You can't answer that?

Mr. BUSCHMAN. No, I cannot answer that. I would assume—it would be purely an assumption on my part, and would be out of place.

Senator BARTLETT. You said that you have—you said when an Air Force base is destroyed, there obviously is going to be no need for oxygen. No one might quarrel with that conclusion, but there is something that might happen short of absolute destruction of an Air Force base.

Mr. BUSCHMAN. There is a justifiable reason for this which should be presented by the Air Force inasmuch as it could involve security information. I think they are the ones who——

Senator BARTLETT. Let us leave security aside for a moment. Anytime you go into a hearing with military involved, security is thrown at you, and I think that without violating security at all, we can say that an Air Force base, if an enemy is accurate, is going to be hit before an adjoining community, and its installations are likely to be wiped out before the installations in that community, the civil installations. Doesn't that follow naturally?

Mr. BUSCHMAN. I believe you will find, though they express it much better than I, that the manner in which the Strategic Air Command operates, planes may descend on any one of these bases at any moment without any notice whatsoever. The first thing that happens is they must be fueled, they must receive liquid oxygen. They may at that point leave, or they may stay for some time.

Again, the flights may come in almost immediately thereafter, and may not come in for some time. So, there has to be an immediate capability on very rapid notice.

Now, storage is an important factor, and I believe you will find that the Air Force does have storage. You will also find that they do have the plants and, as I pointed out to you before, Senator, under

the method that they have, they have capability both from private sources and from their own sources.

Senator BARTLETT. Well, they have now, but if this program gets too big, they may not have the capability from civilian sources because they may not be left where the Air Force is the principal purchaser of their products. Now——

Mr. BUSCHMAN. I might comment that the industry does exist today, and under the policy of the Air Force procuring approximately 50 percent of their requirements for a number of years.

Senator BARTLETT. Yes; that is obvious. But they now confront an expanded program in the Air Force which is going to become universal across the land, apparently. The situation tomorrow could easily be much different than that which it is today. The personnel, trained personnel to which you refer, are these uniformed people who will operate the plants?

Mr. BUSCHMAN. I would assume so; yes. They are uniformed personnel.

Senator BARTLETT. And now, are these plants to go only into SAC bases?

Mr. BUSCHMAN. No; I believe Tactical Air Command bases, but I would prefer the Air Force to identify those for you.

Senator BARTLETT. You did refer—Chairman Bible mentioned to you Alaska. Is there an oxygen tank at Elmendorf Air Force Base?

Mr. BUSCHMAN. I can't answer that.

Senator BARTLETT. Is there an oxygen——

Mr. BUSCHMAN. I would assume there have to be oxygen tanks there.

Senator BARTLETT. Is there an oxygen plant at Ladd Air Force Base?

Mr. BUSCHMAN. There are two plants there, as I recall, and my memory has to serve me on this, at Ladd and at Eielson, as I recall on each of the bases. These each have a 1-ton capacity.

Senator BARTLETT. Do you know how much, approximately, of the Air Force needs for oxygen in that area is supplied by the civilian producer?

Mr. BUSCHMAN. The Air Force reports again that they procure about 50 percent of their oxygen from the producer. The producer did supply 27,000 gallons last year and I would assume from that that the requirement is in the neighborhood of 54,000 gallons.

Senator BARTLETT. You think that is about 50 percent?

Mr. BUSCHMAN. This is what it was supposed to have been, just about that.

Senator BARTLETT. And you believe that it is well for the U.S. Government to proceed with this program?

Mr. BUSCHMAN. Yes, sir.

Senator BARTLETT. Do you consider it essential to the security of the country?

Mr. BUSCHMAN. I certainly do.

Senator BARTLETT. Why?

Mr. BUSCHMAN. For the very same reason that I feel and I agree with the Air Force that the first thing you must do is put that oxygen on the planes, and you must have it available at all times. I would prefer to rely on two methods of insuring that those planes do have

the oxygen rather than any one single method. I would hate ever to be faced with a situation in which one of the strategic commands was suddenly, for any reason whatsoever, without oxygen.

Senator BARTLETT. Well, oil has to go into the plane's motors. Would you be in favor of putting oil refineries on Air Force bases?

Mr. BUSCHMAN. Well, here again, of course, you have storage as a means and with very, very expensive installations.

Senator BARTLETT. Food has to go into soldier's stomachs. Would you approve an agricultural project at each Air Force base?

Mr. BUSCHMAN. No.

Senator BARTLETT. I don't see any essential difference.

I have no more questions.

Senator BIBLE. There was one statement made, Mr. Buschman, and maybe again this is more properly directed to the Air Force than to you, but I was trying to find it here in the statement. At least it was indicated to us that, either in the communication or the testimony his morning, the industry had been encouraged to enlarge their plants in order to meet Defense needs. Are you familiar with that?

Mr. BUSCHMAN. Yes. I am familiar with that. We did make a check on the tax amortizations that were approved that did go through the Office of the Assistant Secretary of Defense, Supply, and Logistics. I believe you will find that, in most instances, they were, if not all instances, approved on the basis of liquid oxygen for missile application.

Now, this does not mean that this will be particularly true where a manufacturer could have customers both for missile application and for air-breathing purposes. But the staff that checked this said that it was for missile application.

Senator BIBLE. If they were encouraged to enlarge their plant capacity in 1958, wouldn't it be a little unfair now to try to take away some of the business that they would ordinarily secure if you were not going into this industry yourself?

Mr. BUSCHMAN. I have received no statement that any of the business is going to be taken away from these people. If——

Senator BIBLE. They will lose some of their business. That is the testimony.

Mr. BUSCHMAN. The procurement in this particular product is made essentially by the Department of the Air Force and is placed out to the local producers. The total requirement isn't going to change in this, and I might add that, in making this procurement, small business is taken into consideration in the procurement of liquid oxygen, but it is made essentially by the Department of the Air Force from one of the procurement bases. It is not made at each base itself. They let contracts that are open so that at the base they may draw from the supplier.

Senator BIBLE. Now, you state—and I realize the Air Force will develop the point—that this is a part of a continuing procurement that has been going on for about 5 years. Is that correct?

Mr. BUSCHMAN. As far as the procurement of this equipment is concerned, yes.

Senator BIBLE. Procurement of liquid oxygen-manufacturing plants on bases is concerned.

Mr. BUSCHMAN. That is correct.

Senator BIBLE. Now, has the industry at any previous point protested this competition with private enterprise?

Mr. BUSCHMAN. The industry has not protested this to our office. If they have protested to any other office, we do not know of it.

Senator BIBLE. Well, maybe industry is a good deal like some of us. We don't find out what you people are doing for 4 or 5 years.

Mr. BUSCHMAN. I believe the Bulletin 60–2 policy, or the commercial industrial activities policy, has been well known for a number of years, and I believe the Department of Defense program, which has been in my judgment a good one and an aggressive one, has been well known.

Senator BIBLE. Now, the Air Force will be in a position to testify as to the experiences in these various bases where they have had liquid oxygen-producing plants over the past 3 or 4 years? They can tell us about their experiences there. Is this correct?

Mr. BUSCHMAN. Yes.

Senator BIBLE. You prefer not to testify about that at this point?

Mr. BUSCHMAN. No, because they are much more qualified than I am to answer these questions and can present it in a much better manner than I would be able to present it because of their close familiarity with it.

Senator BARTLETT. Mr. Chairman, I might just make a short statement. Programs change in the Air Force, too. Now, on March 22, I was advised by the Air Force that this squadron of fighter planes at Ladd Air Force Base near Fairbanks was to be replaced by a newer model, the very newest for defending these northern skies so close to Siberia. I have here in my hand now a letter which came to me only this morning from the Air Force saying the squadron will be inactiviated on August 1. Half of the entire fighter strength in Alaska is going to be removed for budgetary reasons. It is pretty hard for me to reconcile that with the request for millions of dollars to proceed with an enterprise competitive with private industry. In my opinion it isn't justified.

Senator BIBLE. I think your observation is a good one. Being a lawyer by profession—and this can be off the record because we are going to recess now until 2 o'clock tomorrow afternoon.

(Discussion off the record.)

Senator BIBLE. We will now be in recess until 2 o'clock tomorrow afternoon.

(Whereupon, at 4:30 p.m., the committee took a recess until 2 p.m., Friday, May 13, 1960.)

# GOVERNMENT COMPETITION WITH BUSINESS: LIQUID OXYGEN PRODUCTION

FRIDAY, MAY 13, 1960

U.S. SENATE,
SELECT COMMITTEE ON SMALL BUSINESS,
SUBCOMMITTEE ON RELATIONS
OF BUSINESS WITH GOVERNMENT,
*Washington, D.C.*

The subcommittee met, pursuant to recess, at 2:05 p.m., in room 312, Old Senate Office Building, Senator Alan Bible (acting chairman of the subcommittee) presiding.

Present: Senators Bible, Williams, and Bartlett.

Also present: Walter B. Stults, staff director; Wiley S. Messick, counsel; William D. Amis, professional staff member; Harold Putnam, counsel; and Ernest A. Warden, of Senator Schoeppel's office.

Senator BIBLE. Gentlemen, the hearings will resume.

I think yesterday we had completed all of the testimony except that of the Air Force, and I think we were about to hear General Sutterlin. Is this correct?

Mr. STULTS. That is correct, sir.

Senator BIBLE. General, will you come forward and bring whomever of your staff and aides you would like to have with you?

## STATEMENT OF BRIG. GEN. F. J. SUTTERLIN, DEPUTY DIRECTOR OF OPERATIONS, HEADQUARTERS, U.S. AIR FORCE; ACCOMPANIED BY HUGH WITT, OFFICE OF THE ASSISTANT SECRETARY, AIR FORCE (MATERIEL); CARLTON W. CARTER, OFFICE OF THE DEPUTY CHIEF OF STAFF FOR MATERIEL, DIRECTORATE OF SUPPLY AND SERVICES; AND WILLIAM E. POLLOCK, OFFICE OF THE DEPUTY CHIEF OF STAFF FOR MATERIEL, DIRECTORATE OF PROCUREMENT

General SUTTERLIN. Mr. Chairman, I have with me Mr. Hugh Witt, Office of the Assistant Secretary of the Air Force for Materiel.

Senator BIBLE. We are glad to have you with us.

General SUTTERLIN. Mr. Carlton W. Carter, Office of the Deputy Chief of Staff, Materiel, Directorate of Supply; and Mr. William E. Pollock, Office of the Deputy Chief of Staff, Materiel, Directorate of Procurement.

Senator BIBLE. Fine.

Gentlemen, if you will be seated.

We have before us your prepared statement, General, and possibly you want to proceed first on that.

General SUTTERLIN. I would, Mr. Chairman.

Senator BIBLE. Very well.

General SUTTERLIN. Mr. Chairman and members of the committee, I am Brig. Gen. Frederick J. Sutterlin, Deputy Director of Operations, Headquarters, U.S. Air Force. In this capacity, and also as a military pilot and citizen of the United States, I have a keen interest in the combat readiness of our forces. Today's military forces have to be capable of reacting in seconds and, at the most, minutes, if this Nation is to survive an overt attack by a major power. We no longer have plenty of time to get ready after a war starts—as has been the case in past wars.

My purpose in appearing here today is to assure the committee that there is a vital operational need for an oxygen-generating capability on Air Force bases accommodating war units.

I want to make it clear that it is a basic Air Force policy of several years' standing that all bases assigned a war mission for which liquid oxygen is required will have sufficient generating capability to meet the war requirement. This policy further provides that the generators will be operated in peacetime to assure a constant state of equipment serviceability and provide for peak personnel skill and efficiency.

Our current proposed procurement does not mark a departure from past actions.

Each man, each missile, each airplane, in fact, all elements of our offensive and defensive forces, must be so equipped as to guarantee their capability to react effectively and immediately to whatever combat situation we might encounter, whether they be at home base, dispersed, or deployed overseas.

Our airplanes as well as our missiles these days are extremely complicated and expensive items. The Nation would be foolhardy, indeed, to take a chance on any one component not functioning as it should when we need it to fight.

Mr. Chairman, if I may insert here, a man in the airplane is a component of that weapon system.

The situation depicted in the old fable about "for want of a nail the shoe was lost"—and, consequently, the battle—cannot be allowed to lose us a war.

The weapons of today are so powerful that failure of just one fighter to intercept its assigned target in time could mean the loss of an entire American city. Failure of one bomber to reach its target could mean dozens of enemy bombers left free to launch toward dozens of our cities and help to saturate our defenses. Both consequences are obviously unacceptable.

My background is primarily bombardment, although I have some personal experience with fighters. Both use liquid oxygen. On one occasion in an F–102, I had to stop my climb at 16,000 feet because moisture or other residue in the oxygen had frozen and clogged the system. In a combat situation this could have been disastrous. A man just don't function at high altitude without oxygen. Had I been after a hostile bomber, he wouldn't have gotten any trouble from me at all.

With these sorts of pictures confronting us, the policy I stated earlier is necessary to insure that our fighting units have reliable liquid oxygen where and when they need it for war.

In the past several years, we have gradually built up our inventory of generators as our inventory of aircraft requiring liquid oxygen increased and as dispersal of our forces expanded the number of bases from which they (the aircraft) must operate.

All told, we have bought 280 1-ton-per-day-capacity generators. As these generators were acquired, procurement authority and funding were approved by those committees of Congress having jurisdiction in this area. Our current proposed procurement, therefore, represents only an additional requirement for a type of equipment already authorized and in wide use throughout the entire Air Force. Our current policy and its continuance are operationally necessary because—as an aside here, Mr. Chairman, I would like to say that many of these points have been covered in previous testimony.

Senator BIBLE. That is all right. I do not think repetition hurts, General.

General SUTTERLIN. (*a*) Liquid oxygen is essential to modern high-altitude military aircraft operations for crew breathing purposes. We must, therefore, have an assured supply not only for combat readiness but for the continuance of combat once a war has started. Our inventory of aircraft requiring liquid oxygen has increased through the years to the point where practically all of our first-line aircraft now require it. These are:

(1) B–47, B–52, B–57, B–58, B–66 bombers.

(2) KC–135 tankers.

(3) All Century series airplanes and fighters F–100, F–101, F–102, F–104, F–105, and F–106.

(4) C–130, C–133 transports.

You will note that this list includes all the types of aircraft assigned to Strategic Air Command, Air Defense Command, and Tactical Air Command, the commands which will bear the brunt of any combat.

Liquid oxygen cannot be stored for long periods of time without constant replenishment to maintain stock levels. Our experience is that under military storage circumstances, daily losses of one-half to 1 percent of volume occur.

Under conditions of war, commercial sources may either be sabotaged or destroyed, or other conditions of war may drastically curtail their ability to produce and deliver oxygen precisely when needed.

Liquid oxygen requires specialized transport equipment (trucks and rail cars) which may themselves be substantially eliminated by conditions of war.

A high degree of purity for liquid breathing oxygen is required. Bases must be in a position to rapidly replenish any found to have deteriorated beyond usable limits. In time of war, this might not be possible from commercial sources, for reasons stated above.

Liquid oxygen generators are complicated mechanisms. Unless personnel are trained in their use and are available, and the equipment itself ready as of the opening of hostilities, we cannot do our job in the ensuing fight. Time to assemble and train crews and commence production will have vanished.

Under wartime conditions, deployment of units with complete support, including liquid oxygen, will be required.

Commercial concerns are subject to strikes and labor disruptions in the fields of both production and transportation. Complete re-

liance upon commercial sources in event of such an occurrence could leave the Air Force helpless. Moreover, in time of a red-hot emergency, the importance of liquid oxygen to the defense effort would point to those commercial sources not actually destroyed as prime objectives for sabotage.

For these reasons, an on-base capability to produce liquid oxygen for breathing purposes is essential to the Air Force war potential. There is no acceptable, practicable alternative.

I would like now to call attention to the fact that a liquid oxygen-generating capability is an approved, integral part of our operational ballistic missile sites. This approval was predicated on the importance of liquid oxygen to missiles and a firm belief that nothing relative to their combat readiness should be left to chance.

It is not my intent in any way to raise a question where missiles are concerned because I think our policy in this respect is also absolutely correct. I wish to emphasize the fact that liquid oxygen is no less important to manned aircraft. Once fired, the liquid oxygen requirement for a given missile no longer exists. On the other hand, manned aircraft may return again and again for refueling, rearming, a change of crew, and so forth, and be dispatched on additional missions. So long as there is a requirement during war for aircraft to be airborne, nothing within the limits of human ability to forestall must be permitted to stand in the way of our providing oxygen for our crews.

I sincerely hope that my remarks have been helpful to the committee and that they have fully clarified our position with respect to a function which may have the appearance of competition with private business. Please let me further assure you that this policy was adopted only after careful consideration and evaluation of our potential enemies' known and estimated capabilities had conclusively convinced us that it was essential to the successful waging of any war. As I am sure you realize, it is the policy of the Air Force to rely to the greatest extent possible on commercial sources for our supplies and services. However, the importance of liquid oxygen to our manned aircraft cannot be too strongly emphasized. It must be available when needed, where needed, and in the quantities needed. In the overall pattern of combat aircraft operation, oxygen is no less important than fuel, ammunition, or even the aircraft itself. Without it we are dead.

Senator BIBLE. Thank you for your opening statement, General.

I think we ought to examine a number of things you have said. Of course, you have had the benefit of hearing the presentation made by the industry witnesses.

You say that this policy in this present procurement—the subject of this hearing—for seventy 1½-ton liquid oxygen generating units, is not a departure from your past actions. Is that correct?

General SUTTERLIN. That is correct, sir.

Senator BIBLE. When was this policy to procure liquid oxygen generators first developed?

General SUTTERLIN. Mr. Witt, I believe, is more familiar with it.

Senator BIBLE. For the record, is that Mr. Witt or deWitt?

Mr. WITT. W-i-t-t.

Senator BIBLE. What is your official title, Mr. Witt?

Mr. WITT. I am an administrative assistant in the Office of the Assistant Secretary of the Air Force, Materiel—Mr. Phillip Taylor is the Assistant Secretary.

Senator BIBLE. Very well. How long have you been there in that position?

Mr. WITT. Six years.

Senator BIBLE. You are a civilian employee?

Mr. WITT. I am, sir.

Senator BIBLE. Very well.

Mr. WITT. In the early fifties, as our new aircraft were coming into the inventory, we were faced with the problem of obtaining oxygen for high-altitude breathing purposes for our pilots. A policy was developed within the Air Staff at that time to the effect that it was to the best interests of the Air Force in carrying out their mission to have our own integral LOX plants at base level. This policy was reviewed again when Mr. Dudley Sharp was Assistant Secretary.

Senator BIBLE. When would this be?

Mr. WITT. This was several years ago. I could furnish it for the record, if necessary, but it was in the middle fifties I would say—1954 or 1955, or in that period.

Senator BIBLE. I think it would help if you would furnish it for the record so we have the exact date.

Mr. WITT. Yes, sir.

Senator BIBLE. Your statement is that it is about 1954–55?

Mr. WITT. That is right.

Senator BIBLE. And it was reviewed again by Assistant Secretary of Defense Dudley Sharp?

Mr. WITT. This is correct.

Senator BIBLE. All right.

Mr. WITT. We went into it very thoroughly in our own staff at the time. We went into the various aspects which concerned this policy. We reviewed it with the operations people, and the materiel people, at that time.

The new Assistant Secretary, Mr. Phillip Taylor, when he came into the office—and I can pin this all down for you if you wish—within the last 2 years it was brought to his attention and we reviewed it again with him. I would like to point out that this was not a snap judgment in any respect. The problems of storage were considered, and all of the different aspects which had been presented during the 4½ hours or so of testimony yesterday. We considered every one of these. We went over it very thoroughly with our materiel people, who are responsible for support, and our operational people.

The Assistant Secretaries usually don't get the easy decisions. They handle a lot of tough ones, and I would like to point out that this was not an easy decision. We had facing us many of the aspects which we heard enumerated yesterday.

On the other side of the fence we had our operational people explaining the war plans to us. We had discussions of where these weapons were going to be deployed; where they were going to be redeployed. We had to go into questions of reconstitution of forces after attack. We had to discuss which base would probably be around, and which one might not be around. We had to listen to discussions of whether or not the enemy threat was the same today as it was yes-

terday. These are all things we go into when we review a policy of this significant nature.

I read where Mr. Truman had a sign on his desk which said, "The buck stops here." I would like to assure you, sir, that the buck stops at many desks in the Pentagon, and this decision was reviewed very thoroughly and the decision was made at the assistant secretarial level. Any change in this we consider as striking very deeply at our operational concept, as we understand it.

Somebody yesterday went so far as to mention that the Air Force had some new toys to play with. Well, sir, we do not consider these toys. This business to us is a deadly serious business.

Senator BIBLE. I am sure it is to everybody, so let us not labor the point.

Mr. WITT. Thank you, sir.

There was a mention of hiding behind national security. Our national security is our job. This is what we live with day in and day out.

You stated yesterday, very appropriately, I felt, that this was a question of judgment. We feel, too, it is a question of judgment. We have had to make decisions after weighing all of these factors. We have had inputs from both sides, and we realize that there are certain inadequacies in our policy. There is no argument there. We know, for instance, that our airmen are not as competent when it comes to operating this equipment as the men there working on commercial activities 8 hours a day. We do not argue that point, but we say we have to have these men as they come and go and as they rotate and as they fail to reenlist, and we have to have new airmen. We say we must continue to train these men so that if the flag goes up, we are ready to have the liquid oxygen on hand as it is needed.

This may sound a little emotional, sir, and I am sorry if it does. On the other hand, this is an emotional problem to the Air Force.

I thank you very much.

Senator BIBLE. Now let me ask either you or the general a few questions to put this in proper perspective and to examine the reasons you are giving for your national security.

You have detailed some here and I think you have to judge your presentation by the validity of these reasons that you give.

Mr. WITT. Yes, sir.

Senator BIBLE. You say first:

**Liquid oxygen is essential to modern high-altitude military aircraft operations for crew breathing purposes.**

I guess no one disagrees with this premise. Then you say:

**We must, therefore, have an assured supply not only for combat readiness but for the continuance of combat, once a war has started.**

No one disagrees with that conclusion. Then your second statement is—and this seems to be an area where there could well be a difference of opinion, it seems to me—you say:

**Liquid oxygen cannot be stored for long periods of time without constant replenishment to maintain stock levels.**

Can you justify that statement?

Mr. WITT. We have the experience on liquid oxygen equipment which we presently have—and we have this, sir, based on actual operations at base level, sir.

Senator BIBLE. My understanding is that this is based upon the present equipment which you have. Is that correct?

Mr. WITT. Yes, sir. And it includes the problems of handling it and putting it into the bottles, and putting it into the plane, and losses which are involved in handling this on a military base, and under conditions of airmen doing the work. Yes, sir.

Senator BIBLE. You heard the industry's testimony as to the developments in the field of storage and the adequacy and capability of that storage. I think you heard them testify to that?

Mr. WITT. I did.

Senator BIBLE. I am certainly no expert in the field and I do not pretend to be. We are just attempting to get at the truth of the matter, and find out what the real differences are.

Mr. WITT. Yes, sir.

Senator BIBLE. Has the Air Force ever attempted to take one of these large tanks that are mobile and hold great quantities of liquid gas and use them on their base operations?

Mr. WITT. Well, sir, under our operational concept we must be prepared to move all or parts of this equipment if it is so desired during the operation under military operations, shall we say. We have smaller ones, and I think they are 500 gallons in most cases. These are relatively easy to transport as compared to something like what we were shown yesterday, 70,000 gallons.

Mr. CARTER. 13,500.

Mr. WITT. 70,000 pounds, I guess. It was of the weight of the item itself. Those are terrifically large tanks. When we get into considerations of dealing with storage facilities of this size and this magnitude, we are faced with (*a*) whether or not we should have one of this size on a base—whether we need it for peacetime as well as wartime use; (*b*) whether or not we have the capacity to carry this under airlift. As you know, airlift right now is a very serious problem and is being discussed by other congressional committees at this time.

Mr. STULTS. I wonder if I might break in right there, Mr. Witt? You mentioned the 500-gallon storage tank you presently use. That is pretty easily portable, is it not?

Mr. WITT. I said relatively easy, compared with 13,000.

Mr. STULTS. Are you aware of the specifications and the blueprints that went out on this request for proposals that this committee is currently studying for the seventy 1½-ton plants?

Mr. WITT. I am not intimately aware of every bit of it, but we have enough here to discuss it.

Mr. STULTS. Do you know what the blueprints show for the building to contain those plants? How big is that storage tank?

Mr. CARTER. I think I can answer it. The blueprint as shown does contain a 2,000-gallon tank.

Mr. STULTS. Thank you.

Mr. CARTER. But I would like point out one thing further, if I may.

Senator BIBLE. You can clarify your answer. Certainly.

Mr. CARTER. That is in the blueprint, and we have absolutely no intention of procuring any 2,000-gallon tank so long as we have available in ample quantity to adequately manifold together or to install separately 500-gallon tanks. Now, a blueprint and what sometimes comes into being is frequently somewhat different.

Senator BIBLE. Maybe you made a mistake of putting it in the blueprint. Is that what you are saying?

Mr. CARTER. I am not saying that at all. This is desirable. What I am saying is we will not put any 2,000-gallon tanks in where we have adequate quantities of 500-gallon tanks available to do the job. In other words, we are not going into that additional expense. But I do want to clarify it a little further.

If we do, in supplying these generators, require tanks over and above our present capability, they will be in all probability 2,000-gallon tanks. And we expect that our loss factor will be somewhat improved by the use of those for these particular installations.

Senator BIBLE. Let me move back a moment, because it did seem to me that this storage problem could well be the real crux of this entire problem. The storage problem itself. I wish one of you would tell us about these past procurements.

As I understand it, you started procuring them 4 or 5 years ago. These are what—1-ton-per-day capacity generators? Is that right?

Mr. WITT. That is right. It is not correct to say that we started procurement 4 or 5 years ago. It was a little earlier than that. I believe Mr. Buschman indicated it was 4 or 5 years ago.

Our first procurement, as I remember it, was what? 1951, Mr. Pollock?

Mr. POLLOCK. Yes. September 1951.

Senator BIBLE. How many did you procure in 1951, and what did you procure, and where did you put them? How many men did it take to maintain it?

Mr. POLLOCK. Thirteen.

Mr. WITT. Thirteen were procured with 1951 money, or was that in 1951? Do you have that?

Mr. POLLOCK. I couldn't say. It was September 1951. It could be 1950 money.

Senator BIBLE. You referred to them, General Sutterlin, as 280 1-ton-per-day-capacity generators.

Mr. WITT. This is true.

Senator BIBLE. Are all of these units the same?

Mr. WITT. Roughly the same. They are 1-ton capacity. I think they were procured from several companies so there might be some difference, but they are capable—all of them are capable of turning out 1 ton of LOX per day.

Senator BIBLE. They are essentially the same type of a liquid oxygen generator?

Mr. WITT. Yes, sir.

Senator BIBLE. Is this a correct statement?

Mr. WITT. This is correct.

Senator BIBLE. They each have a 1-ton-per-day capacity?

Mr. WITT. Yes, sir.

Senator BIBLE. Are they portable generators?

Mr. WITT. Yes, sir. They are considered portable. Either wheel mounted or skid mounted.

Senator BIBLE. And when they go to the various bases that are under your command do you build any permanent installation in connection with them?

Mr. WITT. Not to my knowledge. They might put something like a light Butler-type building around them to protect them from the elements, so that the airmen who are servicing them and maintaining them are protected from weather, and so forth. It does not have to be a permanent-type building. Isn't that correct?

Mr. CARTER. That is correct, Mr. Witt.

Senator BIBLE. There are 280 generators on different airbases in your command?

Mr. WITT. Yes, sir.

Senator BIBLE. Are they scattered around at various bases around the command?

Mr. WITT. Yes, sir.

Senator BIBLE. And that will be how many generators?

Mr. CARTER. 280.

Senator BIBLE. Yes, but how many generators would be the maximum on any one of those bases?

Mr. CARTER. It would depend on the mission of the base at the time.

Senator BIBLE. It would be two, or three, or four?

Mr. CARTER. Running down this list we find several bases with three.

Mr. WITT. And one with five. That is an oversea base in Japan.

Senator BIBLE. And that would vary somewhat?

Mr. CARTER. Yes, sir.

Mr. WITT. Yes, sir.

Senator BIBLE. You started procuring these in 1951?

Mr. WITT. Yes, sir.

Senator BIBLE. You have annually made procurements in varying numbers until now you have reached a total on base strength of 280 generators. Is that correct?

Mr. WITT. Yes. We have not bought some each and every year since then. The procurement was through about 1956, I believe. Is that correct?

Senator BIBLE. Was the last time you made a procurement in 1956?

General SUTTERLIN. The contract was signed in 1956.

Mr. WITT. Yes, sir.

Senator BIBLE. How many men are assigned to each one of these generators? How many men does it take to run them?

Mr. CARTER. Two, sir. Two per shift. Let's put it that way. So if we run one around the clock it would be on an average six men assigned to that particular generator, if it were running around the clock.

Senator BIBLE. What type of military personnel do you use to run these generators?

Mr. CARTER. Airmen of grades anywhere from—I can't always quote the grades correctly—but of sergeant rank.

Senator BIBLE. What you are saying is you use about six sergeants per generator?

Mr. WITT. If they are running 24 hours a day.

Mr. CARTER. When I say of sergeant rank, of course, there would be a shift leader who would be of higher rank than the others. I am not saying they are all the same grade sergeant rank. There may be corporal rank, or comparable to that. I think they grade them now

airman first, second, third, and fourth, and not being directly involved I have a little difficulty myself in keeping this completely clear in my own mind.

Mr. WITT. We could submit it for the record.

Senator BIBLE. I think it should be submitted for the record. It will be helpful.

Mr. WITT. I will be glad to.[1]

Senator BIBLE. How do you go about training these men you put on these generators? Who trains the men?

Mr. CARTER. Insofar as possible they are checked out by air training command on generators which are in their possession primarily for this use. Insofar as the theory of generation is concerned in a brief checkout. This course runs 2 to 3 weeks or thereabouts, but on-the-job training is what we primarily rely upon for the development of peak proficiency and skill.

Senator BIBLE. And you reached this procurement, or the peak of this procurement, or this total procurement, I should say, in 1956?

Mr. WITT. That was the date that the contract was signed, was it not, Mr. Pollock?

Mr. POLLOCK. Yes, that is correct.

Mr. WITT. And they may have been delivered, allowing for production leadtime, probably a year later or so.

Senator BIBLE. During the course of the time—it still continues to intrigue me that from 1951 to 1956 you procured 280, and during this period did you receive any complaints or protests from the private operators and the individual liquid oxygen producers?

Mr. WITT. A few; yes, sir, relatively few, as I remember it. Let's see, maybe it was 1957 or 1958 that we got a relatively few letters asking about this. We replied to them and did not hear anything further.

Senator BIBLE. In addition to the liquid oxygen which would be produced by these 280 1-ton-per-day liquid oxygen generators, how much additional liquid oxygen did you go out and procure from private business during this period of time?

Do I understand that you used about a 50–50 factor? Is that what I have been given to understand?

Mr. WITT. The 50–50 factor is based on the last few years' output, and this was a spot check. We have not telephoned or made a complete survey of every base, sir, but this is roughly the best estimate we have at this time. Really, to pin this down as to actually how many pounds were bought worldwide, it would take some sort of a survey. Isn't this true?

Mr. CARTER. That is correct, Mr. Witt.

Senator BIBLE. I do not think it is necessary for the purposes of this hearing, but I was just curious as to the relative amount of liquid oxygen which was produced on base, and how much you procured off the base. I understand you to say that that is probably about a 50–50 factor?

Mr. WITT. Yes, sir.

Senator BIBLE. I do not want to put words in your mouth, but that is what I understood. That is roughly it?

[1] See app. II, p. 171.

Mr. CARTER. Yes, sir.

Senator BIBLE. Do you have any further questions? I want to get to another phase, but I wonder if you have any further questions as to this.

Mr. STULTS. If I might follow through on your questions, the procurement from 1951 through 1956 was of 1-ton capacity, portable skid-mounted or wheel-mounted units. Is that right?

Mr. WITT. This is correct.

Mr. STULTS. The procurement which we are now considering is what?

Mr. WITT. Is what?

Mr. STULTS. Is it for 1-ton portable units?

Mr. WITT. 1½ ton.

Mr. STULTS. Portable?

Mr. WITT. These are air transportable. They are not considered in the pure sense of the word "portable" as such.

Mr. STULTS. What is not air transportable, Mr. Witt?

Mr. WITT. Well, it is a larger unit than the 1-ton unit.

Mr. STULTS. But could you give me an indication of what is not air transportable, if you broke it down far enough? Could you take this ton-and-a-half unit and stick it in any aircraft you now have?

Mr. WITT. Yes. It can be transported. It can't be transported in one piece.

Mr. STULTS. How long does it take to break down a unit, let's say, that you are going to put at McGuire Air Force Base? How long would it take you to take it off production at McGuire and knock it apart and air ship it to an area of operation and reassemble it?

Mr. WITT. I don't have any estimate on the total time.

Mr. STULTS. You don't? This you say is for redeployment purposes. How could you possibly buy something for redeployment if you do not know how long it is going to take you?

Mr. WITT. May I point out that the 1-ton units are portable.

Mr. STULTS. Yes, sir.

Mr. WITT. The 1½ tons we are buying——

Mr. STULTS. Yes, sir.

Mr. WITT. Will in most respects replace the 1-ton units, which are transportable.

Mr. STULTS. The 1½?

Mr. WITT. We will put the 1-ton units in locations where we will need to transport them from that location to another one.

Mr. STULTS. So you have all the portable ones you want right now. Is that correct?

Mr. WITT. Yes. That is basically true. When you say portable, meaning it is mounted on wheels and skids, are they easily transportable? Did you want to add to that?

Mr. CARTER. I think I might be able to add something to it to clarify the record in this matter.

I happened to sit in on a conference at Memphis Air Force Depot, which is the prime depot monitoring generator procurement, this past October, when the question of quantity was very much considered. At the time it was determined that going to, or continuing with the 1-ton unit which we currently have, would have required—and I am not going to be specific on this figure, but the figure of 113 sticks in

my mind—that we should have bought under this present procurement to fill out our overall requirements to fulfill our basic policy within the Air Force.

Mr. MESSICK. Policy for what? Mobility or deployment?

Mr. CARTER. Policy covering the inhouse capability to produce the oxygen, which embodies the necessity of deployment.

Mr. STULTS. This is 113 units of what size?

Mr. CARTER. Of a 1-ton unit, if we had continued to buy 1-ton units. I am relating it to an overall——

Mr. STULTS. So you took two-thirds of that figure and got 1½ tons.

Mr. CARTER. So it was decided at that time we should give a look at a 1½-ton unit rather than the 1-ton unit and reallocate those 1-ton units both in the country and overseas, to those who required a greater degree of mobility and deployment. And this was the basis for that decision.

Mr. STULTS. General Sutterlin and Mr. Witt, or Mr. Carter, I think this committee is not talking so much about the 280 which are presumably portable, but we are talking about seventy 1½-ton units which, according to the blueprints which you have sent out, require a rather permanent base of bricks and mortar building. A 20-by-40 site. Industry witnesses have estimated that to get that equipment on the line would take some 90 days.

Can you rebut that?

Mr. WITT. I will say this: Brick and mortar is not an adequate term or a correct one, in all cases.

Mr. STULTS. It might be quonset huts?

Mr. WITT. In many cases a Butler-type light frame building of less than brick and mortar terminology would be appropriate and will be used. We also plan to rehabilitate, where possible, an existing structure, if we have one on a base, and you can put this unit in there. Then this would be very appropriate and our people are advised to take advantage of that, where possible.

Mr. STULTS. The industry's experience has, it seems to me, indicated to them that it would take some 90 days to take the pieces and put them together and get this thing in production. Do you have estimates on that score at all?

Mr. CARTER. I have not, sir. I am not in either the maintenance field or the construction field, but I would like to say this: I don't know what the industry's estimate covered—whether they have been putting it down somewhere else and putting a building around it or not, but I can assure you if we ever had occasion to move them or were we permitted to under wartime conditions, I doubt very much if they would ever see a building.

Mr. STULTS. Mr. Witt told the committee that this was a very serious decision, and I am sure that that is true. He said the threat of enemy action strikes deeply at the heart of our operational mission, and he talked to us about the problems of deployment and redeployment being considered. This was your testimony just a moment ago, I think, Mr. Witt, in your opening statement.

I wonder if it is true that these 1½-ton units, when that flag goes up, as you put it—I wonder if those 1½-ton units really can be picked up and can be transported easily and put into production easily at another site?

Mr. WITT. It depends on what you mean by "easily." They are not as easily movable as the 1-ton units. Definitely. There is no argument there.

Mr. STULTS. You were talking about Memphis last fall, Mr. Carter, and you considered 1-ton units there and decided not to buy any more of them. Did you at that time consider the state of the art in the storage area, and how much it would cost you to get the same amount of national security by means of storage facilities at bases?

Mr. CARTER. Sir, you are asking me whether we considered a change to a basic policy, which I was not empowered to do at that time, and which I was not sent down there to consider at all.

Mr. STULTS. Who gave you orders to consider changing from 1-ton to 1½-ton?

Mr. CARTER. No one. Let me clarify the record right now on this issue. I did not make this decision. I was merely a member representing a review team from Headquarters, USAF, representing the materiel side of USAF. We met with representatives of all commands and with the Memphis people and with the technical people. When I say "technical people" I mean those who are fully competent in the knowledge of generator operation and purchase, which I am not.

This was a decision that was reached at that time through these individuals concerned that we would be better serving the Air Force were we to acquire these ton-and-a-half units rather than more of the portable 1-ton jobs for the specific application which we have in mind for these units.

Mr. STULTS. During that discussion last fall, was there consideration given by anyone that you know of to storage facilities vis-a-vis generation facilities?

Mr. CARTER. I do not recall it at the moment. I do not believe that there was, but again I point out we were not there considering changing a basic Air Force policy.

Mr. STULTS. You think this would have been a change in policy?

Mr. CARTER. I do, indeed.

Mr. STULTS. To generate rather than to store?

Mr. CARTER. This is correct.

Mr. STULTS. Even though either one would have made it available at the point of use?

Mr. CARTER. You reversed it.

General SUTTERLIN. I think you reversed them.

Mr. STULTS. Yes. Storage instead of generation.

Senator BIBLE. I guess the truth of the matter is the Air Force has not examined the potentialities and possibilities of using storage instead of the on-base generating capacity. Is this true?

General SUTTERLIN. That is not, Mr. Chairman.

Senator BIBLE. All right. Let us clear the record on the matter.

General SUTTERLIN. The basic policy is to have a capability on base to manufacture liquid oxygen, and this is to be sufficient for the war requirement. Whether we have plenty of storage, and if it is true this stuff can be stored without any loss, it still does not change the requirements we have.

Senator BIBLE. Assuming you can store it, and assuming you can store it in adequate quantities?

General SUTTERLIN. Sir, if you would use the term "in quantity."

Senator BIBLE. In quantity. You would questtion the use of my word "adequate"?

General SUTTERLIN. Yes, sir.

Senator BIBLE. And with very little loss, then why would not that meet Air Force requirements?

General SUTTERLIN. We would still have the requirement to replenish whatever the capacity storage was, and there would still be a requirement to replenish it. We maintain that we must have that inhouse capability because we cannot depend on outside sources.

Senator BIBLE. Why not? If you have large storage capability right on the base why can't you call up one of the private producers of liquid oxygen and have him put it on a truck and haul it over to you?

General SUTTERLIN. At the time we wanted to we might not even have a telephone, sir.

Senator BIBLE. Then you might not even have a base.

General SUTTERLIN. That is right.

Senator BIBLE. If you do not, you won't have any use for that liquid oxygen.

General SUTTERLIN. Not at that base. That is correct. We do not know which base will be there.

Senator BIBLE. I am very interested in this because as I read your reasons over they boil down to the storage problem as much as any other thing. Your next point is:

Under conditions of war, commercial sources may either be sabotaged or destroyed.

I think that would be equally valid for any bases.

General SUTTERLIN. That is right.

Senator BIBLE. You go on:

* * * or other conditions of war may drastically curtail their ability to produce and deliver oxygen precisely when needed.

You have that same general risk, and probably you are a more inviting target than some poor little liquid oxygen commercial producer who is removed from the base. Is that right?

General SUTTERLIN. We expect to be. We expect to be the target.

Senator BIBLE. That is why I do not think it is a particularly good reason.

Liquid oxygen requires specialized transport equipment (trucks and rail cars) which may themselves be substantially eliminated by conditions of war.

I suppose that generalized reason goes to anything else you need on your base which may be a requirement. I think it was pointed out by Senator Bartlett yesterday that maybe you have to move in groceries, and are planning on having a complete agricultural capability within your base. I think you can carry that reasoning too far—to fuel oils and such things. You can carry it to absurdity. I do not think it is a good reason.

Mr. WITT. May I speak to that, sir?

Senator BIBLE. Briefly, yes.

Mr. WITT. Thank you, sir. We feel that the possibility of strikes has not been given full consideration.

Senator BIBLE. I am getting down to that. You can comment for the record when I get down to it.

Mr. WITT. I thought you were through discussing storage at that point. I am sorry.

Senator BIBLE. The next statement is:

**A high degree of purity for liquid breathing oxygen is required.**

Is it your position that the commercial enterprises and private industry is not producing a high degree of liquid breathing oxygen?

Mr. WITT. Sir, we must have high-quality breathing oxygen, whether we can produce it or whether industry produces it. The fact that we now are relying on industry for roughly half and ourselves for roughly half, I think, more or less supports this. We do not question the purity of what we are getting now. There might be a few cases. I don't know. But I don't think there is any definite complaint in that regard.

Senator BIBLE. I just wondered why you said that, but go ahead.

Mr. WITT. But if wartime activities break out, if there is some danger of what storage we have being contaminated in any way, we must be able to run that through our own plant for purification purposes. We would like to have that capacity under our own control.

Senator BIBLE. I am not particularly impressed with that reason. It seems to me that private enterprise and these commerical sources can produce a liquid breathing oxygen of the same high degree of purity as you can on base.

Mr. WITT. Under conditions of war, sir, we would like to have complete control of the basic things that we need.

Mr. STULTS. Jet fuel?

Mr. WITT. We will have our ammunition stored and our bombs ready, and pilots will be there, trained and ready to go. We have to have the LOX in the state and condition that is necessary, and in the quantity necessary.

Senator BIBLE. Do I understand you to say you have it stored on base?

Mr. WITT. We have these small storage containers we discussed earlier, 500 gallons, and so forth.

Senator BIBLE. How many of those do you have?

Mr. WITT. It varies per base, depending on how many planes and whether or not they are in a redeployment plan and whether or not we anticipate that and fervently hope that they will still be capable of having planes come back and land and get fresh oxygen supplies and take off again. As of course we know, most of the commercial industry is located in centers of highly industrialized area, because this is where most of their business is in most respects. Then we would certainly want to have a LOX plant there under our control with our airmen running it.

If those planes come back and land we will have a source of LOX there under the control of the commander of that airfield.

Senator BIBLE. The next point you make is:

**Liquid oxygen generators are complicated mechanism. Unless personnel are trained in their use and are available, and the equipment itself ready as of the opening of hostilities, we cannot do our job in the ensuing fight. Time to assemble and train crews and commence production will have vanished.**

Of course, that point, I think, is tied pretty much into that storage point, because if you can secure adequate sources, or have complete

capability or adequate capability by storage then I do not know why you have to have the production facility.

General SUTTERLIN. That is different. Your use of the word "adequate" we do not agree with there because we cannot consider a storage tank, or a supply source some distance away, as adequate to meet the war plan.

Mr. STULTS. How about jet fuel? Do you have any refineries on any airbases you know of?

General SUTTERLIN. No, we do not.

Mr. WITT. Refineries?

Mr. STULTS. Yes.

Mr. WITT. No, sir.

Mr. STULTS. Do you consider that storage and replenishment of supplies from long distances is sufficient so far as jet fuel goes?

General SUTTERLIN. We are talking about apples and oranges here.

Mr. STULTS. No. I think not. You just made a statement to this committee you did not consider storage and the necessity of replenishment of storage from long distances adequate to your war requirements.

General SUTTERLIN. For LOX. For LOX, sir.

Mr. STULTS. You add it is just true for LOX and not for jet fuel?

General SUTTERLIN. I am sorry if I gave another impression.

Mr. STULTS. What is the distinction between liquid oxygen and jet fuel?

General SUTTERLIN. Well, one is that the volume is vastly different.

Mr. STULTS. There is greatly more jet fuel needed?

General SUTTERLIN. That is correct. And you can move jet fuel in milk cans if you have to, but you cannot do that with oxygen.

Mr. STULTS. It is quite true you need a great deal more jet fuel, and it often has to come from greatly increased distances. Is that right?

General SUTTERLIN. Yes. And we have already some pretty fair sized storage capacity for fuel.

Mr. WITT. Mr. Carter has been in this in some detail and I feel sure he could add some information to this which will assist you.

Mr. CARTER. If I can address myself to the question of jet fuel, which you just mentioned?

Senator BIBLE. Yes, sir. Clear it up for the record.

Mr. CARTER. As it relates to the specific question concerned. All of our bases which have a wartime mission having a specified capability to carry a specified amount of fuel in keeping with war plans. Down the road somewhere, in a secluded area, we hope, and hardened quite frequently—and I mean in hardened storage—is the remainder of the fuel which we require in keeping with today's concept of the war which we are fighting.

It is under our control and it has a predetermined place in which it is to be dispensed. It is in many, many cases attached to this base by pipeline, or else we have equipment at our disposal which can go down and get it, if other ways fail. And, as General Sutterlin puts it, if there is a requirement to do so we can go down and get it in 5-gallon milk cans, although I certainly do not advocate that. But we cannot go down and get it in anything less than an insulated vacuum bottle rail car or truck if we are talking about oxygen.

Mr. STULTS. You are aware of the fact that Douglas Aircraft built for the Air Force in the Thor missile a container which will hold 43 days' supply, or 43 days' output of a 1½-ton oxygen generating unit?

Mr. CARTER. Yes, sir. Certainly we are aware of that.

Mr. STULTS. You are aware of the recompression unit put out by Norelco which cuts storage losses down to zero?

Mr. CARTER. Yes, sir.

Mr. STULTS. You think you are better off putting full dependence on an operating oxygen generating facility rather than on storage?

General SUTTERLIN. We are not putting full dependence on that, sir. The commercial sources are available and, as has been stated, we use 50 percent of the requirements, which is just about the case worldwide now.

Mr. WITT. And we want these units for war readiness. We are not advocating that every single bit of our requirement at every single base be totally military produced. If you notice in our comments we say these are war-mission bases only. At many of our bases where we have a lot of training activity and no war mission we are relying on our good friends in the commercial business for millions of dollars worth.

Senator BIBLE. On the point of the 50–50 basis, just so we do have the record abundantly clear on it, I wish without making an exhaustive project of it and doing too much work, you would supply for the record at least on the basis of the 50 States, your use of liquid oxygen from commercial sources and your purchase of liquid oxygen from commercial sources.

Mr. WITT. Would you want every single base?

Senator BIBLE. Just the total. Is this hard to procure? Because you repeatedly say you are not putting private enterprise out of business because—and you come back to the statement—you are purchasing 50 percent of your liquid oxygen requirements from them.

Mr. WITT. This is on a spot check.

Senator BIBLE. All I want you to do is substantiate that.

Mr. WITT. We can certainly make a survey aimed at that, can't we?

Mr. CARTER. I would like to make one thing quite clear. I cannot go across the board at this point and say that State-by-State we are in all cases buying 50 percent of our overall requirement in any given State.

Senator BIBLE. I am not asking you to do that, but I am asking you to tell me of your total requirement, is the total Air Force requirement for liquid oxygen procured 50 percent from private sources and 50 percent on base.

Mr. CARTER. I think we can make one distinction on the record on this.

Senator BIBLE. Just so we understand each other. That is all.

Mr. CARTER. That we should relate this for the purpose of breathing oxygen, and other purposes not related to missiles.

Mr. WITT. That is correct.

Senator BIBLE. That is all right.

Mr. WITT. That is all we are discussing here today.

Senator BIBLE. Very good.

Mr. WITT. Very good.[2]

Mr. STULTS. Do you feel these units must be in operation 24 hours a day to be effective for your wartime mission?

General SUTTERLIN. No, sir.

Mr. STULTS. How much time do you think they should be in operation to be effective?

Mr. WITT. Enough to make sure that the crews are acquainted with the equipment and know how to maintain them and operate them. We are faced with a certain amount of turnover in personnel as I am sure you know.

Mr. STULTS. Do you suppose 12 hours every 30 days is sufficent?

General SUTTERLIN. I don't know frankly——

Mr. CARTER. I would say not.

General SUTTERLIN (continuing). Exactly how many hours a day.

Mr. STULTS. Are you aware of what the U.S. Marine Corps is doing in this respect?

General SUTTERLIN. For high altitude breathing oxygen, sir?

Mr. STULTS. For their liquid oxygen generating plants.

Mr. WITT. Just a minute, sir. This is frequently an area of confusion and I would like to clarify it. The statement has been made that the Navy does not have the same policy as we do. One reference as I remember it was—which one was it you referred to yesterday?

Senator BIBLE. Bremerton, I think, is the example that was used.

Mr. WITT. My understanding is this is a repair shop. Is that correct? I believe that was their testimony.

Mr. STULTS. Yes, sir.

Mr. WITT. We have the same policy as the Navy as far as using LOX in repair shops.

Mr. STULTS. You purchase every cubic foot, or every gallon, or ton?

Mr. WITT. To the best of my knowledge we do not have any liquid oxygen or other generating equipment for the purpose of industrial repair activities.

Mr. STULTS. When you undertake repair in one of the Alaska bases, do you go out and buy a container?

Mr. WITT. I don't know. Do you have something on that?

Mr. CARTER. Let me put it this way: I think this may clarify it. Our policy is we do not generate one drop of liquid oxygen now, at the present time, or in the past, at any base which does not have a bona fide needed support for war missions; and if a base drops from the category of supporting a war mission it drops out of that business immediately.

Mr. STULTS. What would the Air Force do that is not a war mission, Mr. Carter?

Mr. CARTER. What would we do that is not a war mission?

Mr. STULTS. Yes, sir.

Mr. CARTER. We would train pilots, for one things.

Mr. STULTS. That is not a war mission?

Mr. CARTER. That is a war mission to the extent of training the pilot, it is not a base that will support a mission when war breaks.

[2] See app. II, p. 171.

As a matter of fact, all training from that angle will, undoubtedly, immediately cease.

General SUTTERLIN. May I address myself to that question?

Mr. STULTS. Yes, General.

General SUTTERLIN. I do not want to get into the realm of classified information but "war units" is sort of a loosely used term here. Of course, everything in the Air Force is a war unit, but the bases we are talking about, on which we want this LOX capability, are war strike units, except in the case of troop carriers. These are units which actually will fight. These are bases on which fighting units committeed in a war plan are located.

Mr. WITT. They are loaded and ready to go in the future. So we fail to see where this is exactly comparable to the Navy's situation.

Mr. STULTS. I still do not understand the difference between loaded and ready to go by an airman who spends his time learning his trade on a production unit and a man who must provide liquid oxygen when his unit is deployed into a war area where liquid oxygen is not obtainable. Could you make the distinction clear to me as to why you are fighting differently, let us say, than the Marines?

General SUTTERLIN. It is certainly probable that the Navy war plans provide for liquid oxygen at the place where these Marines are going to be deployed. I do not know their war plans. But they cannot fight in high altitude airplanes without it. They have to have it.

Mr. STULTS. But they seem to feel that training their men 12 hours every 30 days, as I understand it, is sufficient to give them the technical training needed, whereas you people seem to feel you should be on the job more of the time than they.

General SUTTERLIN. I cannot answer that.

Mr. WITT. I could not argue with their mission. We have our own reasons that we think are good and solid, and we feel we have wrung it out thoroughly.

Senator BIBLE. Let us move our questioning along and I will give you an opportunity to comment on the strike situation, because you wanted to talk about that earlier.

Mr. WITT. Yes, sir.

Senator BIBLE. You make the statement:

> Commercial concerns are subject to strikes and labor disruptions in the fields of both production and transportation—

and so forth.

You heard the testimony yesterday from the representative of the operating engineers to the effect that they have never had a strike in four decades in the production of liquid oxygen from commercial sources. It appeared to me that that was a very significant statement, and I am very glad to have your comment.

Mr. WITT. I have here an excerpt from the Wall Street Journal which I will be glad to submit for the record or discuss with you, as you wish, sir. There is one headline: "Linde Air Products Co. Reopened Two of the Five Struck Plants; Talks Set Today," "Open Hearths Idle in the Chicago Area," Iron Age, March of 1957. "Shortage of Oxygen Due to the Linde Air Products Strike * * *"

We do not want to gamble on these types of things.

(The excerpts referred to, follow:)

[From the Wall Street Journal, Mar. 11, 1957]

TALKS TO RESUME TODAY ON ENDING STRIKE AT LINDE'S OXYGEN PLANT—UNION CARBIDE UNIT SAYS OPERATION BY SUPERVISORY HELP IS TWO-THIRDS NORMAL

(By Kenneth S. Smith)

PHILADELPHIA.—Negotiations are to resume here today aimed at ending a 6-week-long strike at a liquid oxygen plant that is being operated by supervisory personnel at a claimed two-thirds of normal.

The plant, at nearby Essington, is one of the major producing units of Linde Air Products Co., a division of Union Carbide & Carbon Corp. Operating the plant are nearly a score of Linde supervisors in place of some 120 hourly employees who've been on strike since January 25 in a dispute over new contract terms. The strikers are members of Local 12-548 of the AFL-CIO Oil, Chemical and Atomic Workers International Union.

Four other Linde plants have been struck also, but the Essington unit is unique in that management personnel, headed by R. G. Frye, plant manager, last week started up production in the strikebound property.

MEDIATORS TO RUN TALKS

Over the week-end, however, William Rose, a Commissioner of the Federal Mediation and Conciliation Service, announced that management and union representatives have agreed to resume their talks under the auspices of the Government agency. Mr. Rose will be chairman of a panel of mediators including George W. Woomer, Pittsburgh, and Thomas W. Robertson, Cleveland, both Commissioners with the Federal Service.

Mr. Rose said today's negotiations "will be confined exclusively to discussion pertaining to the Essington plant." Subsequently, he said, it is expected the panel of mediators will resume negotiations at Pittsburgh, concerning Linde's struck plant at Kittanning, Pa., and possibly later with representatives of other struck plants at Youngstown, Ohio, Moundsville, W. Va., and Tonawanda, N.Y.

The strike had cut off almost all production and shipments from Linde's unit here of oxygen, nitrogen, and argon, components of air which are separated, purified, and liquefied in the plant. Liquid oxygen is used widely in steelmaking to enrich the open-hearth charge and to clean the surface of the metal while it's being rolled.

It also is used in such diverse fields as atomic energy, guided missile programs, paintmaking, and medicinal applications.

Union pickets, for example, have permitted truckloads of oxygen destined for hospital and medicinal uses to come through plant gates. However, they permit no other shipments to go past them. Nonetheless, since production has resumed, new supplies of liquid oxygen have reportedly left the plant by rail.

Last Thursday, due to what Mr. Frye and other company spokesmen describe as obligations to customers, to the community, and to "any employees who want to return to work at * * * increased wages and benefits," the Linde plant started producing after its long lull.

On hand were about 20 managerial and other salaried employees. Production, the company said, reached about two-thirds of capacity.

That the plant has been operating is acknowledged even by the union pickets who stroll back and forth at plant gates, or huddle over a fire while they bake potatoes for a wintry midday snack. When even part of the big compressors, interchangers, and other equipment housed in the plant is being operated, the earth vibrates a block away and windows in a few nearby houses rattle a bit.

SOME PICKETS SKEPTICAL

But Harry Sharp, a lean oxygen service man, and a handful of his picketing coworkers, including a truck filler and maintenance men, eye the plant somewhat skeptically and comment: "If it was operating anywhere near capacity, the ground would be jumping."

And Donald Robertson, president of local 12-548, says: "I would imagine that if they could operate safely and efficiently with 14 or so people, they'd have done so before."

Adds another union man at the gates: "I'd like to know who's been telling my wife we get paid for walking around here. She believes it, and I couldn't even bum 50 cents off her to ride the bus."

The union local here has asked for a 20-cent hourly wage boost across the board, plus time-and-a-half pay for Saturday work and double time for Sunday, as well as a union shop clause.

The company's offer to date includes a 12-cent hourly wage boost, pay adjustments in several job grades, and a 30-cent hourly premium for straight time worked on Sunday.

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[From Iron Age, Mar. 14, 1957]

OPEN HEARTHS IDLED IN CHICAGO AREA

A shortage of oxygen due to the Linde Air Products Co. strike, and the easing steel market, caused steel companies in the Chicago area to withdraw 12 to 15 open hearth furnaces from production. Higher cost of nonoxygen operation of the furnaces is regarded as pointless unless order books for finished steel begin to fill at a more rapid rate. Youngstown Sheet & Tube, meanwhile, closed down five furnaces in its Chicago plant due to a "temporary inventory adjustment."

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[From Bethlehem (Pa.) Globe-Times]

EMERGENCY CREW MAKES OXYGEN AT STRUCK PLANT

PHILADELPHIA.—About 20 supervisory employees of the Linde Air Products Co. operated the strikebound plant at suburban Essington today to supply vital liquid oxygen to hospitals and the steel industry.

The company said Thursday it intends to maintain two-thirds normal production at the plant, working on a 24-hour basis, until the 135 striking employes return.

The plant is one of four Linde facilities closed by the strike of the Oil, Chemical & Atomic Workers Union since January 24 and 25. A company spokesman said there were no attempts to reopen the other three plants, at Tonawanda, N.Y., Kittanning, Pa., and Youngstown, Ohio.

The spokesman said the strike at the Essington plant has caused a critical shortage of oxygen in the steel industries and hospitals.

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[From Wall Street Journal, Mar. 19, 1957]

LINDE AIR PRODUCTS CO. REOPENS SECOND OF FIVE STRUCK PLANTS; TALKS SET TODAY

(By a Wall Street Journal staff reporter)

PHILADELPHIA.—Linde Air Products Co. has reopened a second of its five struck plants and said production at half the installation's normal rate is being carried on by 25 supervisory people.

At the same time, Federal mediators called for resumption of negotiations today in Pittsburgh on a contract for the newly reopened plant, located in Kittaning, Pa., and employing 160 production workers. On March 7, the company reopened its Essington, Pa., plant on the same basis—"inviting" the striking workers to come to work and offering them "protection."

It says output at two-thirds of capacity has been reached at the Essington plant, which normally has 120 hourly rated employes.

Linde, a division of Union Carbide & Chemical Corp., makes liquid oxygen at the plants struck in early January by the AFL–CIO Oil, Chemical & Atomic Workers Union. Besides the Essington and Kittaning installations, plants at Youngstown, Ohio, Moundsville, W. Va., and Tonawanda, N.Y., are involved.

The latest meeting of company and union representatives was held last Monday in Philadelphia and no progress was reported. Each plant has a separate contract. Local 12–548 at Essington seeks a 20-cent hourly wage boost and other benefits. The company has offered a 12-cent hourly increase and other contract changes.

Senator BIBLE. The testimony yesterday, I think, in fairness to you—and maybe I did not make it quite clear enough—the testimony of Mr. Askew, I think, was directed to the independent oxygen producers. He said that there had not been a strike among them in 40 years.

I do not know how big a producer Linde is and I am glad to have you make any explanation and comment on what he said, so it can be properly evaluated.

Mr. WITT. We do not feel we are in a position to gamble with the mission that has been assigned us to that extent, sir. I have had some personal dealings in this situation in World War II. I remember trying to get to work at an engine plant producing R–3350 engines. I got there and there was a picket line, right in the middle of World War II. I would not have believed it if I had not been there. And I had a rock thrown through my car window by a man who did not want me to go to work that day. We were making engines for the B–29 aircraft to go over and bomb Tokyo. We do not want to gamble on that, sir.

Senator BIBLE. Senator Williams.

Senator WILLIAMS. May I ask a question? I wondered if there were any other aspects of procurement and supply that you apply this reasoning to? Do you suggest the Air Force should now make the engines and airplanes?

Mr. WITT. That is not what I said, sir. I said we want to have the capability of having this vital material on hand.

Senator WILLIAMS. Is not all of your supply for your striking missions vital? Is it not all vital?

Mr. WITT. It is vital.

Senator WILLIAMS. And do you apply this reasoning to any other supply?

Mr. WITT. We have on hand a stock of tip tanks to take care of whatever mission is required in the first number of days of battle. We keep it on hand. We are not going to take chances on having them delivered later. We are going to have ammunition on hand.

Senator WILLIAMS. It is a storage problem?

Mr. WITT. It is a storage item. Ammunition does not have to be maintained at a minus 300° Fahrenheit.

Senator WILLIAMS. Then it does not matter who it is—whether you are storing it privately, or in the Government, I don't think.

Mr. WITT. We have on hand the capability of producing this LOX. We have small storage facilities on hand. It is our requirement that we are capable of turning this LOX out at the quantities needed to support our readiness mission and our readiness mission only. Our peacetime requirements with everyday routine flying is in most part taken care of by the commercial industry.

Senator WILLIAMS. Nothing further.

Senator BIBLE. I continue to think that the problem pretty much boils down to the question of storage and whether this gives you the necessary capability. General, it seems we come to a little parting of the ways there. The industry and yourself too. Because if I understand you correctly you say in addition to storage you must have productive capability.

General SUTTERLIN. Yes, sir.

Senator BIBLE. You distinguish between generation and production versus storage. You say storage unsupported by production is insufficient for Air Force capability.

General SUTTERLIN. I do.

Mr. STULTS. I wondered, Mr. Chairman, if the general or his aides had given any thought to the problem of the attack which might contaminate the air. An enemy strike might very well contaminate the air with radioactive substances or something else. Contaminate the atmosphere, I mean. Is that correct?

General SUTTERLIN. Yes, sir, we have given it a lot of thought.

Mr. STULTS. With this in the air, is it a good time to compress and to generate liquid oxygen for breathing purposes?

General SUTTERLIN. I am not technical enough to know whether they can strain that stuff out or not. I rather doubt it.

Mr. STULTS. Mr. Witt?

Mr. WITT. I would say this: We will work out of the LOX in our own containers.

Mr. STULTS. Yes, sir.

Mr. WITT. And we will have to gamble on whatever else is coming out at that time. If you are talking about radioactive fallout at that time, of course, I am not sure that there will be anybody on the road delivering LOX to anybody, if you are discussing radioactive fallout.

Mr. STULTS. My point is this: If you have the stuff in hard storage—and it can be put in hard storage, we all admit that. Is that right? We can store liquid oxygen. Don't tell me your past experience, because one can draw up specifications to get anything stored.

Mr. WITT. I was not going to tell you about past experiences. I am saying it is possible; yes.

Mr. STULTS. Surely.

Senator BIBLE. The answer is, "Yes," it is possible to store it?

Mr. WITT. Yes; it is possible.

Mr. STULTS. Yes; it is possible. Would hard-storage liquid oxygen be contaminated by any sort of a contaminant?

Mr. WITT. I don't know.

General SUTTERLIN. I am not qualified to answer.

Mr. STULTS. Mr. Carter.

Mr. CARTER. I can only hazard a guess, and I want it properly recorded as such. I believe that it would.

Senator BIBLE. Would or would not?

Mr. CARTER. It would. It is in some way going to have to be vented to the open air, and my feeling is there is a possibility of contamination.

Mr. STULTS. You feel there can be no closed circuit for the flashoff of the oxygen and restorage of it?

Mr. CARTER. I am hazarding a guess. I don't know.

Senator BIBLE. You have had your guess, and we will give the industry an opportunity to answer it.

Mr. CARTER. It may well be something that would have to be determined——

Senator BIBLE. I am not an expert.

Mr. CARTER (continuing). By our engineering personnel. I don't know.

Senator BIBLE. You talk it over with your engineering personnel and supply the answer for the record.[3]

Mr. STULTS. They have not done that, presumably, as far as you gentleman who met at Memphis last fall were concerned?

Mr. CARTER. We were not there for that purpose. I must retrace it again.

Mr. WITT. I believe there is a little bit of confusion on that point. Their object down there was to review requirements and decide what should be done as far as new procurement is concerned. Isn't that correct?

Mr. CARTER. Yes.

Senator BIBLE. You were given a directive to go down and get some generating capacity. You were not looking for storage problems. Is that correct?

Mr. CARTER. That is correct. We were not.

Senator BIBLE. I understand what you say.

General SUTTERLIN. May I have a moment to make a comment on that?

Senator BIBLE. Yes, General. Surely.

General SUTTERLIN. Of course, this requirement has built up as the number of airplanes in the inventory using liquid oxygen increases, and what they had on hand was obviously not enough and the policy being as it is, more was needed. This is why they were down there. to find out what to do about more.

Senator BIBLE. Based upon generating——

General SUTTERLIN. To fulfill——

Senator BIBLE. For generation rather than storage.

General SUTTERLIN. To fulfill the capability demanded by Operations.

Senator BIBLE. Well, let me just clear this point. I think I understand it. The reason you went down to inquire into generation rather than storage was because that was a policy that had come down from higher authority to you. Is that correct?

Mr. CARTER. This is a policy, as is indicated in General Sutterlin's statement, of several years standing, and we were just following through on a basic policy.

Senator BIBLE. May I ask one further question. This is probably directed to you, General. Has that policy been reviewed recently as to whether or not it is possible to use this storage instead of this additional productivity capacity? This is a determination, if I understand the record correctly, that was made probably as long ago as 1951, reviewed again possibly in 1954 or 1955. You have never taken a further look at it because you needed no further procurements after 1956 until you now have this recent requirement of seventy 1½-ton liquid oxygen generators.

Now, you just went ahead and carried on your past policy. Have you hesitated along the way from 1956 to 1960 up to date to see whether or not the development and the improvements in storage might supply your answer rather than rely on onbase productivity capacity? Has that been reviewed?

General SUTTERLIN. Yes, it has.

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[3] See app. II, p. 171.

Senator BIBLE. By whom?

General SUTTERLIN. I cannot answer the last question but I know that it has been reviewed because I was reminded, when this requirement came up, of the paper I signed in 1958. There was a hassle going on at that time within the staff and we——

Senator BIBLE. A hassle as between storage and generation?

General SUTTERLIN. No, sir; as between—I don't know. It was probably money to buy more equipment or budget or something. I don't know. We were asked to again state the policy of the requirement which we did in 1958, I think, March.

Senator BIBLE. You again restated the policy of having onbase generation capacity for liquid oxygen.

General SUTTERLIN. Yes, sir.

Senator BIBLE. At that time did you review the advances that had been made in the art or in the science of storing liquid oxygen to see whether this might be an answer to your requirements?

General SUTTERLIN. No, sir; I did not.

Senator BIBLE. I am wondering if anyone in the Air Force did.

Mr. WITT. Sir. I would like to point out in 1958 we considered the storage problem, the problem of resupplying the storage that, if anything—if it was contaminated in any way, could we get more storage from outside or should we produce it ourselves or have the capability of producing it ourselves. We decided we would be much better off to have within our own control the capability of regenerating anything that was contaminated or producing whatever was required.

Senator BIBLE. Would you mind for the record indicating who "we" are. Who made this determination in 1958?

Mr. WITT. The operation people, General Sutterlin's people, went over with the materiel people. A letter was signed out——

Senator BIBLE. That is vague to me. Can you supply the names and titles of the men? Were you one of them?

Mr. WITT. General Sutterlin signed the letter which his immediate staff had studied and reviewed.

Senator BIBLE. Director of Operations.

Mr. WITT. Director of Operations. They are the people who are directly responsible for the conduct of the war, sir. They signed out a letter to the materiel people, Deputy Chief of Staff for Materiel, Supply and Services. Major General Bondley is Director of Supply.

Senator BIBLE. And was he—is he the man who is responsible for making this decision?

Mr. WITT. I don't know whether he personally went over it or not, but he is the man who signed a letter to the operational people saying, "Would you please review this from an operations viewpoint and consider it?"

Senator BIBLE. Would you supply all of this for the record—I am not going to belabor the point——

Mr. WITT. I believe it is classified or is it?

Mr. CARTER. Yes, it is.

Senator BIBLE. You mean we can't find out who made the decision?

Mr. WITT. We can tell you who made the decision. The letter discussed our problems, our weakness operationally.

Senator BIBLE. I don't care for all that. Supply for the record the names of the men who participated in this 1958 discussion where you determined that you needed onbase productivity capacity and that storage was not sufficient.

Mr. CARTER. Might I give you one point of clarification on the names of the men who would participate in the discussion. It isn't exactly that way, sir. Here is what will happen, and I will clarify this.

If there is a question of whether we are proceeding right on any given policy, on anybody's part, then the proper approach to it insofar as the military is concerned is to refer it to the people who must live with it one way or another. When they do, it may pass through many hands, of the Indians and the chiefs as well, to evaluate every facet of it concerned, from the war plans, and so on.

Senator BIBLE. Give us the whole tribe, will you? [4]

Mr. CARTER. I can give you the whole tribe.

Senator BIBLE. That is all I am trying to do, is just trace it down.

Mr. CARTER. OK. If this is what you require, we can probably give you the tribe.

Mr. STULTS. I think this is pertinent, Senator. Perhaps the general recalls that yesterday the Budget Bureau said they were supposed to review it but they got in touch with the Defense Department and got their OK and took the Defense Department's word that this was essential. We got hold of Department of Defense yesterday and we found out that a Mr. Buschman went and talked to Mr. Carter about this and took pretty much Mr. Carter's word on it. For the Defense Department, Mr. Buschman said that he did not have, except for Mr. Evans, an engineer, a man who was a good liquid oxygen man.

Now, when we have a Deputy Director of the Bureau of the Budget who is making the big decision, we would still like to know just who the liquid oxygen expert was and on what level he made the decision.

Senator BIBLE. Mr. Carter, I think, wanted to comment. Maybe he did not meet with Mr. Buschman, and if he didn't, I want him to exonerate himself.

Mr. CARTER. Yes, I did meet with Mr. Buschman. I make no denial of that whatever.

Senator BIBLE. You looked very pained, so I just wanted——

Mr. CARTER. I looked pained, Senator——

Senator BIBLE. You are entitled to an explanation.

Mr. CARTER (continuing). Because the inference was in that statement that Mr. Buschman came to me and said, well, Carter old pal, what do you think of this and I said everything is okey dokey, leave it alone.

This is not the case at all. When Mr. Buschman investigates, naturally he has a point of contact. When Mr. Buschman meets his point of contact, it is necessary then for him to be referred to certain documents, certain statements, certain decisions involving many individuals much higher than myself. Please, everytime a telephone rings and I give somebody a decision over that telephone or everytime I put a decision in a letter, it does not necessarily reflect my viewpoint. It may be a decision or a policy that has been established some years.

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[4] See app. II, p. 171.

Senator BIBLE. I think you wanted to make a comment, Mr. Witt. We are going to have you do it.

Mr. WITT. Yes. The statement was made that Mr. Buschman had no technical advice to rely on here except that of Mr. Evans who is an engineer. It is my understanding that Mr. Buschman did say yesterday that he had a technical man within OSD who was a Mr. Bates.

He said Mr. Evans was a member of his staff. Mr. Buschman stated he did rely on some technical advice from Mr. Bates within the Office of the Secretary of Defense.

Senator BIBLE. General, in bringing this hearing to a conclusion—I don't think we have very much more ground that need be covered—would it be helpful if Air Force were to review this storage problem in light of the testimony that was given here yesterday? Would that serve any real purpose, or are you of the feeling that there is no potential in this improved storage?

General SUTTERLIN. Frankly, sir——

Senator BIBLE. I want you to be frank.

General SUTTERLIN. I don't believe it will accomplish anything, no, sir, I believe this is a real sound policy. I doubt—scratch the "doubt." I don't want to doubt anything, but I do not feel that any one individual in private industry can unconditionally guarantee to deliver oxygen at the places needed and in the quantities needed precisely at the time needed under any conditions of war. And this is why I say the policy is a good one.

Senator BIBLE. Well, I suppose in complete fairness that there is no one in the Air Force who can unconditionally guarantee to deliver liquid oxygen even from their own generators on base under all conditions, can they? You can't unconditionally guarantee this.

General SUTTERLIN. The chances are a little better, Mr. Chairman.

Senator BIBLE. Well, again I think this is a question of judgment.

General SUTTERLIN. Yes, sir.

Senator BIBLE. I wish you would supply for the record so that we can pursue this further the page and line of the defense appropriation bill which carries the appropriation of some $7 million for this proposed procurement of—I think—what was it—for 70 liquid oxygen plants?

Mr. STULTS. Some of that is also contained, Mr. Chairman, in the 1960 fiscal appropriation. I think the committee——

Mr. WITT. I believe you are right.

Mr. STULTS. I think the committee would like to get both of those figures so we might work with the Appropriations Committee on it.

Mr. WITT. I think it would be very helpful if we gave the 1960 and any—you don't know whether it was 1961 or not? But anyway, why don't we do this. See what was presented to the Appropriations Committee, cite the page and line and explanation as required.[5]

Senator BIBLE. Very well.

Senator Williams?

Senator WILLIAMS. Maybe a couple, Mr. Chairman, if I may.

I understand the Budget Bureau indicated their OK of this proposal of the Air Force, is that correct?

Senator BIBLE. This is true.

[5] See app. II, p. 171.

Senator WILLIAMS. Do you know the attitude of the Department of Commerce on your proposal?

Mr. WITT. No; I do not.

Senator WILLIAMS. How about OCDM? [6]

Mr. WITT. OCDM? Ordinarily under a procurement of this type, Senator, we would not discuss this with OCDM. I mean, we wouldn't have any reason to, in my knowledge.

Senator WILLIAMS. Don't they have a program of encouraging dispersal of productivity capacity?

Mr. WITT. As I—it seems to me that program is an older one and I am not sure that it is completely up-to-date. I would have to check into that. I will be glad to.

Senator WILLIAMS. I believe it is still not a policy or a program but a hope of OCDM that there will be greater dispersal of industry. Now, aren't you working contrary to that and aren't you concentrating productivity capacity and concentrating its right on the bull's-eye, the prime targets, the airbase?

General SUTTERLIN. May I answer that, sir? The concept there is that we have the weapons system on the base. The airplane and everything that goes into it is a weapons system.

Senator WILLIAMS. And that makes it a prime target, I would think, for any action.

General SUTTERLIN. Yes, sir, but the airplane is there too.

Senator WILLIAMS. Does the President know about this?

General SUTTERLIN. I didn't hear you.

Senator WILLIAMS. Does the President know of this program, do you know? Does he have an opinion?

General SUTTERLIN. I don't know, sir.

Mr. WITT. Not to my knowledge has he been personally apprised of this, sir.

Senator WILLIAMS. Well, he has long been an advocate of getting Government out of business and I would judge he would also favor keeping Government out of business wherever possible. We have heard a great deal about that. This certainly is running directly contrary to that attitude of Government, I suggest, and of course, it can't be denied. This is Government occupying an area that is now private——

Mr. WITT. May I respectfully comment on that, sir? The President assigns the roles and missions of the Department, and he is very strongly, I am sure, in favor of the Air Force having the operational readiness that is required to perform this mission. We consider this an integral part of our war-readiness position.

Senator WILLIAMS. I gather that is your position.

I regret, Mr. Chairman, I haven't been able to be here through all of the hearings and I trust the record will give us all the evidence to know whether you made your point or not. I will review it myself very carefully. I wish to submit a letter for the record at this point.

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[6] Office of Civil and Defense Mobilization.

(The letter referred to, follows:)

HOFMAN LABORATORIES, INC.,
*Hillside, N.J., April 8, 1960.*

Re request proposal RFP 40–604–60–5336, bid opening May 2, 1960.

Hon. HARRISON A. WILLIAMS, Jr.,
*Senate Office Building, Washington, D.C.*

MY DEAR MR. WILLIAMS: My attention has been called to the fact that the Memphis Air Force Depot has issued, as of March 18, 1960, requests for bids for the construction of 70 liquid oxygen plants. All but eight of these plants will be located within the continental United States and Alaska.

Liquid oxygen production has been a rapidly growing industry over the past 20 or more years and the product is commercially available almost everywhere in the United States and in Alaska. As a matter of fact, there are enough different private producers of this product that its sale has become a genuinely competitive business resulting in increasingly efficient commercial production.

It is my belief that the Air Force has available to it most of its needs for liquid oxygen at low cost from private sources and that it would be damaging to these producers should the Air Force establish additional facilities except in areas where the product is not commercially available. Businesses which have been built up over the years to serve the Government should not now be faced with competition from the Government, especially where a satisfactory job has been done by private industry.

My urgent request is that bids be suspended until a public hearing can be had and a proper necessity be established.

Respectfully,

G. F. SULFRIAN, *President.*

Mr. WITT. We would be glad to discuss any of these aspects with you or go over any of them that you wish to.

Senator WILLIAMS. I just wanted to make a point that it seems to be running contrary to two policies that we know are part of our national efforts, dispersal and keeping Government, wherever possible, out of business. That is all I have.

Senator BIBLE. General, in just following Senator Williams thoughts, I am wondering if, in making this evaluation, you did consider or give any weight to the economic impact upon those in the industry. Was that a factor that was considered in any way at all? Or is that just——

General SUTTERLIN. I am an operations officer, Senator, and the answer is "no." The readiness of the units and the fighting capability of the Air Force is the primary consideration, and I don't feel I have the leeway or the authority to gamble with those things for any consideration.

Senator BIBLE. And so your answer is that because of those considerations, and the rest of this on national security, the economic impact upon the small businessman and upon the commercial supplier was not considered.

General SUTTERLIN. Yes, sir; and at this time I maintain two things. One, it is not a major competition. It does not take away the entire business from private industry. And two, it is still necessary.

Senator BIBLE. I have no further questions.

Mr. STULTS. Mr. Chairman, I wonder if the information we have requested from the Air Force and from other witnesses might be presented for the record. Other supplementary statements might be included in the record and that we close it next Friday afternoon.

Senator BIBLE. I think we should move along very quickly because the appropriations will be coming out of the committtee very soon and I think they should have the benefit of this hearing here to——

Mr. WITT. Sir, I am not sure about one thing you have asked for here, and that is the analysis base by base of how many pounds of liquid oxygen have been——

General SUTTERLIN. He wants the totals for the 50 States.

Mr. WITT. I know, but to get this we will have to go, I am afraid, into this very thoroughly.

Senator BIBLE. I only want you to substantiate your 50–50 statement, that is all.

Mr. CARTER. Could I ask a question at this point which might serve the purpose?

Senator BIBLE. Very well.

Mr. CARTER. As I believe I pointed out when this question of State-by-State survey was initially brought up, I could not and no one would make a statement to the effect that within each State that we were buying 50 percent versus generating 50 percent, but that in the overall picture throughout the United States we were doing so. I wonder if, in lieu of a State-by-State survey or a base-by-base, if we gave you command figures represented within the United States, if this would serve your purpose. This is much easier and quicker to obtain.

Senator BIBLE. Well, all I want you to do is substantiate your statement that you are not completely putting small business out of business, and that you are buying 50 percent of your liquid oxygen from commercial suppliers. Now, if these command figures substantiate that, that is all I want. I just want to see what your percentages are.

Mr. CARTER. Very well. This will be much more rapidly available than on a base-by-base survey.

Senator BIBLE. I think that is what is sufficient for the purpose of my question.

Mr. WITT. That is what was bothering me.

Senator BIBLE. You can understand the urgency of the fact that the Defense appropriation will be coming along, and we want to apprise them of our interest in this particular problem. That will be the understanding. The record will be kept open for 1 week, 1 week from today. Today is Friday the 13th.

Mr. WITT. I realize that, sir.

Senator BIBLE. I don't know which way that 13 goes, but the record will be kept open until next Friday, May 20, and if the industry cares to make any comments as a result of your testimony today, they may feel free to do so, and the record will be kept open for that purpose, as well as for supplying all supplementary material by 1 week from today. And with that the hearing will be closed.

(Whereupon, at 3:40 p.m., the subcommittee was adjourned.)

# APPENDIXES

## APPENDIX I

(Bureau of the Budget Bulletin 60-2.)

**EXECUTIVE OFFICE OF THE PRESIDENT**

**BUREAU OF THE BUDGET**

**WASHINGTON 25, D. C.**

BULLETIN NO. 60-2 September 21, 1959

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Commercial-industrial activities of the Government providing products or services for governmental use

1. Purpose. The purpose of this Bulletin is (a) to clarify the application of existing policy regarding competition between the Government and private enterprise in the light of executive branch experience under Bureau of the Budget Bulletins No. 55-4 of January 15, 1955, and No. 57-7 of February 5, 1957, and (b) to provide for the evaluation of all commercial-type enterprises not previously reviewed. To make this program more manageable, procedures have been designed to simplify reporting and to permit agencies to direct their major attention to those activities of greatest significance and budgetary impact.

2. Policy. It is the general policy of the administration that the Federal Government will not start or carry on any commercial-industrial activity to provide a service or product for its own use if such product or service can be procured from private enterprise through ordinary business channels. 1/

3. Exceptions. Because the private enterprise system is basic to the American economy, the general policy establishes a presumption in favor of Government procurement from commercial sources. This has the twofold benefit of furthering the free enterprise system and permitting agencies to concentrate their efforts on their primary objectives. However, in specific situations certain factors may make it necessary or advisable for a Government agency to produce goods or

1/ "Commercial-industrial activity...for its own use" includes the provision of services or products primarily for the use of a Government agency (whether the providing agency or other agencies), but excludes, for the purpose of this Bulletin, activities producing a service or product primarily for the public or agency employees. Also excluded are functions which are a part of the normal management responsibilities of a Government agency or a private firm of comparable size (such as accounting, personnel work, and the like). In determining whether an activity is "commercial-industrial" in nature and "can be procured from private enterprise through ordinary business channels," reference may be made to the Standard Industrial Classification Manual (available from the Superintendent of Documents, U.S. Government Printing Office). Additional information about both source and ability of private enterprise to provide a product or service may be secured from the Business and Defense Services Administration of the Department of Commerce.

services for its own use. In these situations the burden of proof lies on the agency which determines that an exception to the general policy is required. A finding must be made that there are compelling reasons for Government provision of a product or service before an exception is authorized. All relevant factors must be taken into account, including pertinent economic and social aspects of public policy, even though they may not be the immediate concern of the agency or official directly responsible for the particular activity.

Compelling reasons for exceptions to the general policy include national security; relatively large and disproportionately higher costs; and clear unfeasibility. Each of these is discussed below.

A. National security. "National security" as a compelling reason for continued Government ownership and operation of an activity is not meant to be all inclusive of all products or services with restricted classifications. Commercial contractors operating under proper security clearances and safeguards have been, and should continue to be, essential to the national defense effort. There are instances, however, when for reasons of national security, an activity cannot be turned over to private industry. These activities may include, but are not necessarily limited to, functions which must be performed by Government personnel in order to provide them with vital training and experience for maintaining combat units in readiness.

B. Costs. Continuation of Government operation on the ground that procurement through commercial sources would involve higher costs may be justified only if the costs are analyzed on a comparable basis and the differences are found to be substantial and disproportionately large. In such cases, the costs of both Government operation and private procurement must be fairly computed and complete. The costs assigned to Government operation must cover all direct and indirect outlays, such as pay and other allowances for personal services and leave; contributions for retirement and disability; supplies; materials; transportation; warehousing; utilities; maintenance; repairs, and similar factors. Appraisal of elements not usually chargeable to current appropriations, such as depreciation, interest on the Government's investment,2/the cost of self-insurance (even though it is unfunded),

2/ Initial costs may be used for determining the value of the Government's investment. However, if the initial costs are no longer valid for purposes of a cost analysis, the estimated current fair market value may be used instead.

After having determined the value of the Government's investment in the activity, the interest cost should be computed by using the current average market yield of outstanding marketable obligations of the United States having maturities comparable to the useful life of the item.

and exemption from Federal, State, and local taxes 3/ must also be made to the extent necessary to put the costs on a comparable basis. On the other hand, costs attributed to procurement from private sources must be computed on an equally fair and complete basis. They should be truly representative of the lowest price the Government would pay for the quantity and quality needed, taking into account all applicable costs of the Government for such procurement, and costs of handling and delivery.

The admissibility of relatively large and disproportionately higher costs as a possible compelling reason for continued Government operation does not alter the general policy which establishes a presumption in favor of Government procurement from commercial sources and does not prohibit procurement from more costly commercial sources. For instance, it may be found to be in the public interest to purchase the product or service, regardless of cost factors, in order to foster or maintain the development or growth of commercial production capabilities to meet ultimate governmental and non-governmental needs at potentially lower costs.

The existence of Government-owned capital assets is not in itself an adequate justification for the Government to provide its own goods or services. The need for continued Government ownership or operation must be fully substantiated. In many instances, evaluation may show that excessive operating costs, obsolescence, replacement costs, or low rates of utilization make continued Government operation unwarranted and liquidation of the asset preferable. Similar examination should be made of any reasons that tend to substantiate a compelling need for continued Government ownership and operation. Even the operation of a Government-owned facility by a private organization through contractual arrangement does not automatically assure that the Government is not competing with private enterprise. This type of arrangement could act as a barrier to the development and growth of competitive commercial sources and procurement through ordinary business channels.

C. Clear unfeasibility. Certain products or services may be found to be clearly unfeasible to procure from private enterprise through ordinary business channels due to the fact that the product or service is:

(1) An integral function of the basic mission of the agency, or

(2) Not available in the particular instance, nor likely to become available commercially in the foreseeable future because of

3/ Benchmarks for estimating taxes may be obtained from Tables 1 and 3, Statistics of Income 1956-1957, Corporation Income Tax Returns, Publication No. 16, U.S. Treasury Department, Internal Revenue Service.

the Government's unique or highly specialized requirements or geographic isolation of the installation, or

(3) Administratively impractical to contract for commercially.

4. Scope of evaluation. Each agency shall:

A. Make an evaluation and report of all its commercial-industrial activities not evaluated under Bureau of the Budget Bulletins No. 55-4 or 57-7. This should include activities which are Government-owned, contractor-operated and those which were established after December 1956.

B. Report the current status of those activities which were evaluated previously under Bulletin No. 55-4 or 57-7, including new starts established prior to December 31, 1956.

To permit speedy evaluation of commercial-industrial activities warranting detailed review and analysis, agencies may indicate their intention to eliminate from all extensive evaluation those activities which must be continued, in whole or in part, because it is clearly unfeasible to procure the products or services from private enterprise through ordinary business channels as defined in paragraph 3C.

When continued Government operation of an activity is determined to be mandatory in the public interest because of one of the compelling reasons enumerated in paragraph 3, such operation should be at a reasonable level of efficiency and economy.

5. Prompt and orderly action in termination or curtailment. Activities which are not authorized as an exception to the general policy because of a compelling reason should be discontinued as soon as reasonably possible. Similarly, activities which are to be curtailed should have their operations reduced as speedily as possible.

Each agency should exercise diligence in carrying out such actions in an orderly way and should proceed on a reasonable time schedule. Adequate notice should be given to the community and employees in advance of discontinuance or curtailment, and each agency should assist employees as necessary in finding other employment. Where statutory changes would be necessary to permit discontinuance or curtailment, the agency head should seek such changes promptly, submitting drafts of legislation or appropriation language, as may be required, to the Bureau of the Budget in the usual manner.

6. Steps to be taken before establishing new activities. No new commercial-industrial activity shall be started until the responsible official has made a formal finding for the record that, due to one of the compelling reasons stated in paragraph 3, Government provision of the product or service is in the public interest. Proposed starts

should be subjected to the same review outlined in this Bulletin for the evaluation of existing activities. 4/

7. Reports. The forms are designed for the evaluation of existing and newly established activities not evaluated previously, and to serve as a basis for review of the current status of activities evaluated previously under Bulletins No. 55-4 or 57-7. Instructions for subsequent progress reports will be issued at a later date. It is intended that future reporting will be limited generally to activities: (a) whose status has changed since their previous evaluation; (b) for which substantiating data on agency determinations have been requested by the Bureau of the Budget; or (c) which have been newly established since July 31, 1959.

Three types of reports are to be submitted. Paragraphs 7A and 7B apply to commercial-industrial activities established prior to December 31, 1956. The total number of installations and activities in these summary and individual reports should equal the total number of installations and activities listed in the Inventory of Certain Commercial-Industrial Activities of the Government, 5/ plus those new starts previously reported to the Bureau of the Budget in accordance with Bulletin No. 57-7. Any differences should be explained.

Those commercial-industrial activities established during the period of January 1957 through July 1959 are discussed in paragraph 7C.

A. Summary evaluation reports of actions and decisions to discontinue, curtail, or continue commercial-industrial activities will be made according to Exhibit 60-2A (copy attached), if the annual estimated cost or value of the product or service is less than $250,000.

Part I applies to activities previously evaluated in accordance with Bureau of the Budget Bulletins No. 55-4 or 57-7. Part II applies to activities newly evaluated in accordance with Bureau of the Budget Bulletin No. 60-2.

B. Individual evaluation reports of actions and decisions to discontinue, curtail, or continue commercial-industrial activities will be made according to Exhibit 60-2B (copy attached), if the annual estimated cost or value of the product or service is $250,000 or more.

Part I applies to activities previously evaluated in accordance with Bureau of the Budget Bulletins No. 55-4 or 57-7. Part II applies to activities newly evaluated in accordance with Bureau of the Budget Bulletin No. 60-2.

4/Establishment of new activities includes the establishment, acquisition, or reactivation of any commercial-industrial activity, regardless of the annual estimated cost or value of the product or service.

5/Issued by the Bureau of the Budget in May 1956.

C. Individual reports of commercial-industrial activities established from January 1957 through July 1959, regardless of the annual estimated cost or value of the product or service, will be made according to Exhibit 60-2C (copy attached).

Two copies of each report shall be submitted to the Bureau of the Budget on or before December 31, 1959. Negative reports should be submitted if appropriate. Detailed substantiating data need not be submitted, but the agency should be prepared to justify its findings.

No reports need be submitted for activities, other than transportation, conducted outside the States of the Union and the District of Columbia.

Up to 50 copies of these report forms may be obtained from the Bureau of the Budget Publications Unit, code 113, extension 2333; if more copies are needed, the agencies should have them reproduced.

8. Delegation. The agency head may delegate to officials within his agency his responsibility for decisions and findings on activities with an annual estimated cost or value of product or service of $1,000,000 or less. In such cases, the one to whom such authority has been delegated must sign the report. No delegation may be made to the official immediately responsible for producing the product or service.

9. Dissemination of policy. The agency head should take appropriate steps to ensure that responsible officials in his agency are familiar with this Bulletin and with the need for continuing review and evaluation. When needed, agency heads shall develop and issue specific instructions and criteria to supplement this Bulletin.

10. Agency responsibility for continuing review. Although this Bulletin does not deal with products or services provided primarily to the public or agency employees, each agency shall keep such activities under continuing review and evaluation to determine if such products or services can be procured from private enterprise through ordinary business channels.

Similarly, although this Bulletin calls only for action and reports on certain commercial-industrial activities conducted by the Government for its own use, agencies are expected to review all commercial-industrial activities on a continuing basis.

By direction of the President:

MAURICE H. STANS
Director

Attachments

Attachment A
To Bureau of the Budget
Bulletin No. 60-2

INSTRUCTIONS FOR SUMMARY EVALUATION REPORT (EXHIBIT 60-2A) FOR ACTIVITIES WITH AN ANNUAL ESTIMATED COST OR VALUE OF PRODUCT OR SERVICE OF LESS THAN $250,000

Part I is to be used for those activities evaluated under Bulletins No. 55-4 or 57-7. If the status of these activities is unchanged from the reports previously submitted to the Bureau of the Budget, it will not be necessary to reevaluate them. When former evaluations are found to be obsolete, current reviews should be made under the criteria of Bulletin No. 60-2.

Part II of Exhibit 60-2A is for those commercial-industrial activities not previously evaluated and which are to be reviewed in accordance with Bulletin No. 60-2.

Each part of the report should be clearly identified by checking the appropriate square. There should not be more than one part on a single sheet and a new form should be used for the next part's activities. When a part is completed, the totals for columns 1, 3, and 4 should be shown. The total number of activities and installations evaluated in parts I and II, when added to those individually reported in Exhibit 60-2B, should equal the total number of activities and installations listed in the Inventory of Certain Commercial-Industrial Activities of the Government (issued by the Bureau of the Budget in May 1956), plus those new starts previously reported to the Bureau of the Budget in accordance with Bulletin No. 57-7. Any differences should be explained.

Each part of Exhibit 60-2A is further divided into two sections: Section 1 applies to Government-operated activities and section 2 applies to activities which are Government-owned, contractor-operated.

In addition to checking the appropriate square on each form, the pertinent agency identification should be inserted at the top of the form. Data given should be as of July 31, 1959. All entries on this summary form should be as concise as possible. Detailed substantiating data need not be included, but the agency should be prepared to justify its findings. The reverse side of this form should be used if necessary for sections 1 and 2.

Specific instructions for each column follow:

Section 1 (Government-operated activities):

Columns 1 and 2 -- If the activity is listed in the Inventory of Certain Commercial-Industrial Activities of the Government, use the same code number and title. If the activity is not listed, use

the code number and title from the Standard Industrial Classification Manual * which best describes the function performed. A brief description of the activity should be included if it is not adequately described in the Standard Industrial Classification Manual. All activities which are subordinate to, and operated solely for a major activity, are to be considered as part of that major activity.

Column 3 — Agency action actually completed for each activity should indicate the number of installations discontinued if the activity has been terminated and the facilities disposed of; curtailed if the volume of operation has been reduced but will continue; continued if the volume of operation has not been terminated or reduced, or other action taken with appropriate explanatory comment.

Example: An agency is listed in the Inventory of Certain Commercial-Industrial Activities of the Government as having a certain activity at fourteen installations. Actually, however, as of July 31, 1959, six of these installations had been discontinued; three were curtailed, and five were still being continued at the same level of operation. The entry in column 3 would be:

| | |
|---|---|
| Disc | 6 |
| Curt | 3 |
| Cont | 5 |
| Total | 14 |

Column 4 — Where action is pending, the specific action planned and the month and year it is to be completed should be entered in this column. Those activities which have actually been discontinued or curtailed as recorded in column 3, should not be entered in column 4.

In following the example cited above for column 3, of the five installations continued as of July 31, 1959, it is planned to discontinue two by January 1960; curtail one by December 1959; curtail another one by June 1960 and continue one indefinitely. The entry in column 4 would be:

| | | |
|---|---|---|
| Disc | 2 | 1/60 |
| Curt | 1 | 12/59 |
| Curt | 1 | 6/60 |
| Cont | 1 | |
| Total | 5 | |

Column 5 — This item need not be completed if the activity is to be discontinued at all installations as shown in columns 3 or 4. If, however, a determination has been made to continue or curtail an activity at one or more installations, or to make other exceptions to the general policy, the compelling reasons for continued Government operation should be given in the following terms: national security; increased costs

* Available from the Superintendent of Documents, U.S. Government Printing Office.

(increased costs must be relatively large and disproportionately high in accordance with paragraph 3B of Bulletin No. 60-2), or clearly unfeasible. The specific reason the product or service is clearly unfeasible to procure from private enterprise through ordinary business channels should be cited from paragraph 3C of Bulletin No. 60-2, e.g., basic mission; unavailable; or administratively impractical.

Thus, in the above example, the compelling reasons should be stated in column 5 for the three installations already curtailed (column 3); the two to be curtailed (column 4), and the one to be continued (column 4) as follows:

| | |
|---|---|
| National security | 3 |
| Increased Costs | 2 |
| Unfeasible -- Unavailable | 1 |
| Total | 6 |

Section 2 (Government-owned, contractor-operated activities):

Columns 1-5 -- Fill out in the same manner as indicated above for columns 1-5 under section 1.

Column 6 -- Indicate total value of capital assets. This figure should equal the total value (initial costs) of the buildings, real property and equipment. If available, the estimated current fair market value should also be included.

Column 7 -- Indicate as an approximate percentage the degree to which the facility is being operated compared to its capacity.

Column 8 -- Indicate the estimated annual cost of the operation to the agency, or the estimated value of the product or service.

EXHIBIT 60-2A

SUMMARY EVALUATION REPORT OF COMMERCIAL-INDUSTRIAL ACTIVITIES WITH AN ANNUAL ESTIMATED COST OR VALUE OF PRODUCT OR SERVICE OF LESS THAN $250,000

☐ PART I. ACTIVITIES PREVIOUSLY EVALUATED IN ACCORDANCE WITH BUREAU OF THE BUDGET BULLETINS NO. 55-4 or 57-7

☐ PART II. ACTIVITIES NEWLY EVALUATED IN ACCORDANCE WITH BUREAU OF THE BUDGET BULLETIN NO. 60-2

Agency _____ Bureau or subdivision _____

Additional information will be supplied by:

Name: _____ Approved by: (sign) _____

Title: _____ Tel.No. _____ Title: _____

Section 1. Government-operated activities: Date: _____

| Standard Industrial Classification Manual | | Agency Determination | | Compelling reason(s) that Government provision is in the public interest. |
|---|---|---|---|---|
| Code (1) | Title and/or description (2) | Action Taken (3) | Action Planned (4) | (5) |
| | | | | |

EXHIBIT 60-2A

Agency: _____ Bureau or subdivision: _____

Section 2. Government-owned, contractor-operated activities:

| Standard Industrial Classification Manual | | Agency Determination | | Compelling reason(s) that Govt. provision is in the public interest | Capital assets (in 1,000) | Production | |
|---|---|---|---|---|---|---|---|
| Code | Title and/or description | Action Taken | Action Planned | | | % Capacity utilized | Annual Cost or Value (in 1,000) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | | | | | | | |

Attachment B
To Bureau of the Budget
Bulletin No. 60-2

INSTRUCTIONS FOR EVALUATION REPORT (EXHIBIT 60-2B) OF INDIVIDUAL ACTIVITIES WITH AN ANNUAL ESTIMATED COST OR VALUE OF PRODUCT OR SERVICE OF $250,000 OR MORE

Part I is to be used for those activities evaluated under Bulletins No. 55-4 or 57-7. If the status of these activities is unchanged from the reports previously submitted to the Bureau of the Budget, it will not be necessary to reevaluate them. When former evaluations are found to be obsolete, current reviews should be made under the criteria of Bulletin No. 60-2.

Part II of Exhibit 60-2B is for those commercial-industrial activities not previously evaluated and which are to be reviewed in accordance with Bulletin No. 60-2.

Each part of the report should be clearly identified by checking the appropriate square. There should not be more than one part on a single sheet and a new form should be used for the next part's activities. The total number of activities and installations evaluated in parts I and II, when added to those summarized in Exhibit 60-2A, should equal the total number of activities and installations listed in the Inventory of Certain Commercial-Industrial Activities of the Government (issued by the Bureau of the Budget in May 1956), plus those new starts previously reported to the Bureau of the Budget in accordance with Bulletin No. 57-7. Any differences should be explained.

In addition to checking the appropriate square on each form to indicate the applicable part, pertinent agency identification should be inserted at the top of the form. Data given should be as of July 31, 1959.

Specific instructions for each numbered item are as follows:

1. If the activity is listed in the Inventory of Certain Commercial-Industrial Activities of the Government, use the same code number and title. If the activity is not listed, use the code number and title from the Standard Industrial Classification Manual * which best describes the function performed. All activities which are subordinate to, and operated solely for a major activity, are to be considered as part of that major activity.

2. Briefly describe the activity if it differs appreciably from the description contained in the Standard Industrial Classification Manual.

3. Identify the city, area, state, or other geographical location of the activity.

---

* Available from the Superintendent of Documents, U.S. Government Printing Office.

4. Check to indicate whether the activity is Government-operated or Government-owned, contractor-operated.

5. The estimated size of the activity as of July 31, 1959 is to be furnished as follows:

a. The total number of man-years should equal the total of civilian and non-civilian man-years, including contract employees if the activity is contractor-operated. The total labor costs should likewise equal the costs of civilian and non-civilian personnel. Where non-civilians are used, indicate the type, such as uniformed service personnel, inmates, patients, or contract.

b. Insert the annual cost or value of supplies and materials used.

c. The total annual cost or value of product or service should equal the total for a and b above.

d. Data for capital assets are required only if the activity is Government-owned, contractor-operated. Initial costs should be given, and if available, the estimated current fair market value should also be included in the appropriate column. Also indicate as an approximate percentage the degree to which the facility is being operated compared to its capacity.

6. Agency determination, based on its evaluation, should be given as follows:

a. Check "Discontinue" if the activity is to be terminated and the facilities disposed of; "Curtail" if the volume of operation is being reduced but will continue; "Continue" if the volume of operation is not to be terminated or reduced, or "Other" with appropriate explanatory comment.

b. Indicate the effective date the action was taken or is planned to be taken.

7. If it has been determined to curtail or continue the activity, or to make other exceptions to the general policy, the compelling reasons for continued Government operation should be given in the following terms: national security; increased costs (increased costs must be relatively large and disproportionately high in accordance with paragraph 3B of Bulletin No. 60-2), or clearly unfeasible. The specific reason the product or service is clearly unfeasible to procure from private enterprise through ordinary business channels should be cited from paragraph 3C of Bulletin No. 60-2, e.g., basic mission, unavailable, or administratively impractical.

Detailed substantiating data need not be included, but the agency should be prepared to justify its findings.

8. Remarks, recommendations, or other comments are invited.

55828 O—60——12

EXHIBIT 60-2B

EVALUATION REPORT OF INDIVIDUAL ACTIVITIES WITH AN ANNUAL ESTIMATED COST OR VALUE OF PRODUCT OR SERVICE OF $250,000 OR MORE

☐ PART I. ACTIVITIES PREVIOUSLY EVALUATED IN ACCORDANCE WITH BUREAU OF THE BUDGET BULLETINS NO. 55-4 or 57-7

☐ PART II. ACTIVITIES NEWLY EVALUATED IN ACCORDANCE WITH BUREAU OF THE BUDGET BULLETIN NO. 60-2

_____ Agency _____ Bureau or subdivision

Additional information will be supplied by: Approved by:(sign) _____

Name: _____ Title: _____

Title: _____ Tel.No._____ Date: _____

1. Activity code number and title as stated in the Standard Industrial Classification Manual:

2. Brief description of the activity if it is not described adequately in this manual:

3. Location of the activity: _____ City or area _____ State

4. Activity is Government operated ☐ or Government-owned, contractor-operated ☐

5. Estimated size of the activity as of July 31, 1959 (dollars in thousands):

| | Number | Cost or value |
|---|---|---|
| a. Civilian man-years | _____ | $_____ |
| Non-civilian man-years | _____ | _____ |
| TOTAL | _____ | $_____ |
| Type of non-civilians _____ | | |
| b. Supplies and materials used | | $_____ |
| c. TOTAL ANNUAL COST OR VALUE OF PRODUCT OR SERVICE: | | $_____ |

d. Capital assets (required only if Government-owned, contractor-operated):

| | Initial Cost | Estimated current fair market value |
|---|---|---|
| Buildings and real property | $_____ | $_____ |
| Equipment | _____ | _____ |
| TOTAL CAPITAL ASSETS | $_____ | $_____ |

Percent capacity utilized _____

EXHIBIT 60-28
Continued

6. Agency Determination:

a. Discontinue ☐ Curtail ☐ Continue ☐ Other _____
(Specify)

b. Effective date the action was taken or is planned to be taken _____

7. If the activity is not to be discontinued, indicate the compelling reason(s) why an exception to the general policy is warranted:

8. Remarks:

Attachment C
To Bureau of the Budget
Bulletin No. 60-2

INSTRUCTIONS FOR EVALUATION REPORT (EXHIBIT 60-2C) OF INDIVIDUAL COMMERCIAL-INDUSTRIAL ACTIVITIES ESTABLISHED FROM JANUARY 1957 THROUGH JULY 1959

This form applies to all new commercial-industrial activities, regardless of annual estimated cost or value of product or service, established during the period from January 1957 through July 1959 (as defined in Bulletin No. 60-2, paragraph 6.).

The pertinent agency identification should be inserted at the top of the form. Specific instructions for each numbered item are as follows:

1. If the activity is listed in the Inventory of Certain Commercial-Industrial Activities of the Government (issued by the Bureau of the Budget in May 1956), use the same code number and title. If the activity is not listed, use the code number and title from the Standard Industrial Classification Manual * which best describes the function performed. All activities which are subordinate to, and operated solely for a major activity, are to be considered as part of that major activity.

2. Briefly describe the activity if it differs appreciably from the description contained in the Standard Industrial Classification Manual.

3. Identify the city, area, state, or other geographical location of the activity.

4. Check to indicate whether the activity is Government-operated or Government-owned, contractor-operated.

5. The estimated size of the activity as of July 31, 1959 and on the date it is contemplated to be in full operation (indicate such date) are to be furnished as follows:

a. The total number of man-years should equal the total of civilian and non-civilian man-years, including contract employees if the activity is contractor-operated. The total labor costs should likewise equal the costs of civilian and non-civilian personnel. Where non-civilians are used, indicate the type, such as uniformed service personnel, inmates, patients, or contract.

b. Insert the annual cost or value of supplies and materials used.

c. The total annual cost or value of product or service should equal the total for a and b above.

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* Available from the Superintendent of Documents, U.S. Government Printing Office.

d. The estimated current fair market value of the capital assets should be given. Also indicate as an approximate percentage the degree to which the facility is being operated compared to its capacity as of July 31, 1959, as well as when the activity will be in full operation.

6. The compelling reason(s) that Government provision of the product or service is in the public interest should be stated in the following terms: national security; increased costs (increased costs must be relatively large and disproportionately high in accordance with paragraph B of Bulletin No. 60-2), or clearly unfeasible. The specific reason the product or service is clearly unfeasible to procure from private enterprise through ordinary business channels should be cited from paragraph C of Bulletin No. 60-2, e.g., basic mission; unavailable, or administratively impractical.

Detailed substantiating data need not be included, but the agency should be prepared to justify its findings.

7. Indicate the date the activity was established.

8. Remarks, recommendations, or other comments are invited.

EXHIBIT 60-2C

EVALUATION REPORT OF INDIVIDUAL COMMERCIAL-INDUSTRIAL ACTIVITIES ESTABLISHED FROM JANUARY 1957 THROUGH JULY 1959

Agency _____ Bureau or subdivision _____

Additional information will be supplied by: Approved by:(sign) _____

Name: _____ Title: _____

Title: _____ Tel.No. _____ Date: _____

1. Activity code number and title as stated in the Standard Industrial Classification Manual:

2. Brief description of the activity if it is not described adequately in this manual:

3. Location of the activity: _____ (City or area) _____ (State)

4. Activity is Government operated ☐ or Government-owned, contractor-operated ☐

5. Estimated size of the activity (dollars in thousands):

| | July 31, 1959 | | Full operation Contemplated ____ 19__ | |
|---|---|---|---|---|
| | Number | Cost or value | Number | Cost or value |
| a. Civilian man-years | | $ | | $ |
| Non-civilian man-years | | | | |
| TOTALS | | $ | | $ |
| Type of non-civilians _____ | | | | |
| b. Supplies and materials used | --- | | --- | |
| c. TOTAL ANNUAL COST OR VALUE | | $ | | $ |
| d. Capital assets | | | | |
| Buildings and real property | --- | $ | --- | $ |
| Equipment | --- | | --- | |
| TOTAL CAPITAL ASSETS | --- | $ | --- | $ |
| Percent capacity utilized | _____ | | _____ | |

6. Compelling reason(s) that Government provision is in the public interest:

7. Date activity established _____.

8. Remarks: (Use reverse side if necessary).

GPO 891591

# APPENDIX II

## (Supplementary Information from the Air Force.)

DEPARTMENT OF THE AIR FORCE
WASHINGTON

OFFICE OF THE SECRETARY

MAY 23 1960

Dear Mr. Chairman:

This letter is in response to request made for supplemental information to be furnished for the Record of your recent Subcommittee hearing on the procurement of liquid oxygen generators by the Air Force.

With regard to the number of personnel required to operate an oxygen generator, the Air Force requires six men, or two men per shift for a 24-hour operation of this unit. The grade of these personnel is determined and authorized by the major command concerned. To cite an example, the Strategic Air Command, in operating one generator, uses one technical sergeant, two staff sergeants and three airmen first class.

The question was also raised as to whether liquid oxygen in storage could be contaminated by radioactive fall-out. It was not possible to obtain absolute assurance that liquid oxygen in storage could not be contaminated by radioactive fall-out, but inquiry of personnel in the Atomic Energy Commission and the Office of the Director of Defense Research and Engineering, developed the opinion that the probability of liquid oxygen in storage being contaminated is relatively small because of the storage pressures and the thickness of the metal container. A complete investigation, or more specific data could not be developed in the time available.

For the names and titles of the personnel who, in 1958, were involved in validating the requirement for an on-base liquid oxygen generating capability, see attachment #1. Furthermore, the policy for the procurement of liquid oxygen generators to support war mission bases was reviewed by Mr. Dudley C. Sharp, then Assistant Secretary of the Air Force (Materiel) in June 1957, and again in April 1958. The same policy was reviewed by Assistant Secretary of the Air Force (Materiel) Philip B. Taylor in December 1959 and in April 1960.

Chairman Bible requested that the Air Force confirm the statement that private producers supply well over 50% of the total Air Force consumption of liquid oxygen during 1959. Our review discloses that, during Calendar Year 1959, the Air Force produced 2,078,000 gallons of liquid breathing oxygen in the 50 States. During the same period of time the Air Force procured from industry 5,284,102 gallons. Thus, it is apparent that private producers supplied 70% of the total Air Force consumption. Furthermore, up to the present date of Calendar Year 1960, there have been let outstanding contracts providing for delivery of 5,313,910 gallons of liquid breathing oxygen. Small business concerns received contracts for 62% of this amount.

For the budget information pertaining to the procurement of liquid oxygen generators, as requested by Chairman Bible during the course of the hearings, see attachment #2.

If there is any further information you desire, please do not hesitate to contact me. It will be secured expeditiously as we are anxious, in light of the present international situation, to proceed with this procurement.

Sincerely yours,

Joseph S. Kingsley Jr.

[illegible] General, USAF
Deputy Director
Legislative Liaison

Inclosures

Honorable John Sparkman
Chairman, Select Committee
on Small Business
United States Senate

PERSONNEL INVOLVED IN REVIEW OF ON-BASE LOX GENERATING POLICY (1958)

Office of Deputy Chief of Staff, Operations

B/G Frederick Sutterlin, Deputy Director, Director of Operations

Col. John DesPortes, Chief, Strat. Sec., Director of Operations

Lt. Col. Robert Cronin, Dep. Chief, Strat. Sec., Director of Operations

Col. Jerome Tarter, Chief, Strat. Div., Director of Operations

Col. H. C. Conner, Deputy Chief, Strat. Div., Director of Operations

Lt. Col. Robert G. Smith, Action Off., Director of Operations

Maj. Richard Cheatham, Action Off., Director of Operations

Col. W. A. Lanford, Chief, Base & Units Div., Director of Operations

Col. R. Olds, Chief, Air Def. Div., Director of Operations

Lt. Col. R. P. Smith, Chief, Plans Section, Director of Operations

Lt. Col. J. R. Petrovich, Chief, Plans Section (TAC), Director of Operations

Office of Deputy Chief of Staff, Materiel

M/G C. J. Bondley, Jr., Director of Supply & Services

Col. M. W. McKeever, Chief, POL Division, Director of Supply & Services

Lt. Col. Richard Schlosberg, Dep.Ch., POL Div., Director of Supply & Ser.

Maj C. L. Tatom, Chief, Dist. Branch, POL Div., Director of Supply & Ser.

Col. N. Matson, Log. Plans Div., Director of Logistic Plans

Mr. C. W. Carter, Supply Off., Dist. Br. POL Div., Director of Sup. & Ser.

## BUDGET INFORMATION RELATIVE TO LIQUID OXYGEN GENERATORS

In the Fiscal Year 1960 Air Force Budget Justification of Estimates for Aircraft Procurement Appropriations, dated January 30, 1959, page 25, TAB 41, $10.9 million was included for Common Ground Handling Equipment. This dollar figure included provision for 31 each AIA (one-ton) LOX generators, at an estimated cost of $2.1 million. The requirement for these generators had been approved during a joint Office, Secretary of Defense/Bureau of the Budget review prior to submission to Congress.

On April 10, 1959, the requirement for one-ton units was pointed out by Air Force witnesses as one of the types of equipment included in this Budget area. (Page 589 of Part 5, Hearings Before the Subcommittee of the Committee on Appropriations, House of Representatives.) There was no discussion of individual items included in the categories mentioned.

In October 1959 a Hi-Valu Review of the LOX generator was held at Memphis Air Force Depot, with representatives from Headquarters, USAF, Headquarters, Air Materiel Command, Headquarters, Air Research and Development Command, and all using Commands. One of the purposes of this conference was to review the requirements computation based on the latest approved Air Force Program.

Past procurement had consisted of the one-ton capacity mobile type generator. However, based on the Strategic Air Command's urgent request for a more efficient, easily maintainable generator, the decision was made to procure a new 1½-ton capacity item. This decision was made only after extensive consideration of SAC's request by the Air Research and Development Command and the Air Materiel Command during the prior six-months period.

It was determined at the October 1959 Review at Memphis that SAC would receive the major portion of the 1½-ton generators, thus releasing a like quantity of the smaller, more mobile units for redistribution to other Commands. At the time the 1½-ton generators are delivered to the Air Force, a decision will be made concerning the specific bases to receive the replaced one-ton units. After careful review of our total requirements and assets on a Command-by-Command basis, the net requirement was determined to be 70 1½-ton generators.

In the Fiscal Year 1961 Air Force Budget Justification of Estimates, Volume III, page 25, dated January 18, 1960, there was included for the Fiscal Year 1960 Program a line item for Generating and Charging Plants,

Oxygen and Nitrogen, totaling $5.2 million. This represented 70 1½-ton units, based upon the best price estimates available at that time for this new item. On page 23 of the Fiscal Year 1961 Budget Justification of Estimates, a Fiscal Year 1961 line item of $2.8 million covered a quantity of 34 1/3-ton trailer-mounted mobile generators, which is a special one-time requirement for the TAC Dispersal Program.

Since these justifications were presented in January of this year, an adjustment has been made in the Air Force generator programs. Originally the 1/3-ton generator was not expected to be procurable until Fiscal Year 1961 because of development problems. However, these problems were solved and, due to the urgency of the TAC requirement for this generator, it was determined that at least a portion of their requirements should be funded in Fiscal Year 1960. Consequently, we have taken action to fund one-half of the total requirements for both the 1½-ton unit and the 1/3-ton unit in Fiscal Year 1960 with the balance planned for Fiscal Year 1961.

# APPENDIX III

## (Specifications and Bid Forms for Liquid Oxygen Plants.)

MIL-G-27253A(USAF)

Superseding
MIL-G-27253 (USAF)
21 September 1959

MILITARY SPECIFICATION

GENERATING AND CHARGING PLANT,
OXYGEN-NITROGEN, SKID MOUNTED,
A/E26A-8

1. SCOPE

1.1 This specification covers a skid-mounted generating and charging plant for the production of oxygen and nitrogen, designated A/E26A-8.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids, form a part of this specification:

SPECIFICATIONS

Federal

| | |
|---|---|
| BB-N-411 | Nitrogen |
| CC-M-636 | Motors, Fractional Horsepower, (Alternating-Current) |
| CC-M-641 | Motor, Alternating Current (Integral Horsepower) |
| QQ-P-416 | Plating, Cadmium (Electrodeposited) |
| QQ-Z-325 | Zinc Plating (Electrodeposited) |
| TT-P-636 | Primer Coating, Synthetic, Wood and Ferrous Metal |
| PPP-C-843 | Cushioning Material, Cellulosic |
| PPP-T-60 | Tape; Pressure Sensitive Adhesive, Waterproof -- For Packaging and Sealing |

Military

| | |
|---|---|
| JAN-P-100 | Packaging and Packing For Overseas Shipment, General Specification |
| MIL-P-116 | Preservation, Methods of |
| MIL-B-121 | Barrier Material, Greaseproofed, Waterproof, Flexible |
| MIL-P-130 | Paper, Wrapping, Laminated and Creped |
| MIL-A-148 | Aluminum Foil |

FSC 3655

| | |
|---|---|
| MIL-V-173 | Varnish, Moisture-And Fungus-Resistant, For The Treatment Of Communications, Electronic, And Associated Electrical Equipment |
| MIL-C-490 | Cleaning and Preparation Of Ferrous and Zinc Coated Surfaces For Organic Protective Coatings |
| MIL-P-514 | Plate, Identification and Plate, Identification, Transportation-Data |
| MIL-T-704 | Treatment and Painting Of Materiel |
| MIL-L-2104 | Lubricating Oil, Internal-Combustion Engine, Heavy Duty |
| MIL-R-3065 | Rubber and Synthetic Rubber Compounds, General Purpose (Except Tires, Inner Tubes, Sponge Rubber and Hard Rubber) |
| MIL-M-3171 | Magnesium Alloy, Processes For Corrosion Protection Of |
| MIL-P-3600 | Packaging of Compressors, Air and Gas (Except Oxygen) Overseas Shipment |
| MIL-P-4185 | Paper, Tissue, Wrapping |
| MIL-E-4970 | Environmental Testing, Ground Support Equipment, General Specification For |
| MIL-S-5002 | Surface Treatments (Except Priming And Painting) For Metal And Metal Parts In Aircraft |
| MIL-C-5541 | Chemical Films For Aluminum And Aluminum Alloys |
| MIL-T-5542 | Thread Compound, Antiseize and Sealing, Oxygen Systems |
| MIL-I-6866 | Inspection, Penetrant Method Of |
| MIL-I-6868 | Inspection Process, Magnetic Particle |
| MIL-T-7003 | Trichlorethylene; Stabilized Degreasing |
| MIL-E-7729 | Enamel, Gloss Aircraft Application |
| MIL-A-8421 | Air Transportability Requirements, General Specification For |
| MIL-P-8585 | Primer Coating, Zinc Chromate, Low-Moisture-Sensitivity |
| MIL-A-8625 | Anodic Coatings, For Aluminum and Aluminum Alloys |
| MIL-T-9107 | Test Reports, Preparation Of |
| MIL-S-13518 | Sealer, Surface, Wood Preservative |
| MIL-V-13811 | Varnish, Waterproofing, Electrical, Ignition |
| MIL-C-15074 | Compound, Corrosion Preventive Fingerprint Remover |
| MIL-P-15424 | Packaging of Hand Tools For Domestic and Overseas Shipment and Storage |
| MIL-P-16232 | Phosphate Coatings, Heavy, Manganese Or Zinc Base (For Ferrous Metals) |

| | |
|---|---|
| MIL-P-16298 | Preservation, Packaging, Packing, And Marking Of Electric Machines Having Rotating Parts And Associated Repair Parts |
| MIL-P-17555 | Preparation For Delivery of Electronic Equipment; Miscellaneous Electrical Equipment (Except Rotating Electrical Equipment) and Associated Repair Parts |
| MIL-G-18997 | Gages, Pressure, Dial Indicating, Bourdon Tube |
| MIL-P-20087 | Paint, Heat-Resisting |
| MIL-L-26087 | Lubricating Oil, Reciprocating Compressor, Ground Support |
| MIL-P-26915 | Primer Coating, Zinc Dust Pigmented, For Steel Surfaces |
| MIL-O-27210 | Oxygen, Aviator's Breathing, Liquid and Gas |
| MIL-D-70327 | Drawings, Engineering And Associated Lists |

STANDARDS

Military

| | |
|---|---|
| MIL-STD-101 | Color Code for Pipelines and for Compressed Gas Cylinders |
| MIL-STD-129 | Marking For Shipment and Storage |
| MIL-STD-130 | Identification Marking Of U. S. Military Property |

DRAWINGS

Ordnance Corps

| | |
|---|---|
| C8987830 | Assembly, LOX Coupling, Male Half, All Sizes |
| C8987831 | Assembly, LOX Coupling, Female Half, All Sizes |
| B8987832 | Gasket, LOX and $LN_2$, All Sizes |
| B8987839 | Ring, Retaining, LOX And $LN_2$, All Sizes |
| C8987855 | Seat, LOX Coupling, 1 Inch |
| C8987856 | Cone, LOX Coupling, 1 Inch |
| C8987857 | Nut, LOX Coupling, 1 Inch |
| C8987869 | LOX Cap, 1 Inch |
| C8987870 | LOX Plug, 1 Inch |
| C8987876 | Seat, $LN_2$ Coupling, 1 Inch |
| C8987877 | Cone, $LN_2$ Coupling, 1 Inch |
| C8987878 | Nut, $LN_2$ Coupling, 1 Inch |

| | |
|---|---|
| C8987888 | Assembly, Liquid Nitrogen Coupling, Male Half, All Sizes |
| C8987889 | Assembly, Liquid Nitrogen Coupling, Female Half, All Sizes |
| C8987890 | $LN_2$ Cap, 1 Inch |
| C8987891 | $LN_2$ Plug, 1 Inch |

Air Force

| | |
|---|---|
| 49A3818 | Connector - Female, Liquid Oxygen Tank, Medium |
| 49A3819 | Nut - Coupling, Liquid Oxygen Tank, Medium |
| 49A3820 | Connector - Male, Liquid Oxygen Tank, Medium |
| 52A3751 | Plug - Dust, Liquid Oxygen Hose, Medium |
| 55C6000 | Hose, Transfer, Liquid Oxygen, Assembly of |

PUBLICATIONS

Air Force-Navy Aeronautical Bulletin

| | |
|---|---|
| 143 | Specifications and Standards; Use of |

U. S. Air Force Bulletin

| | |
|---|---|
| 56 | Preservation, Packaging, Packing And Marking For Shipment Specifications |

(Copies of documents required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 OTHER PUBLICATIONS.- The following documents form a part of this specification. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

National Electrical Manufacturers' Association

Publication ICl Industrial Control, Standards For

(Copies of the NEMA publication may be obtained upon application to the National Electrical Manufacturers' Association, Engineering Department, 155 East 44th Street, New York, New York.)

National Board of Fire Underwriters

Pamphlet 70 National Electric Code (Electric Wiring and Apparatus)

(Copies of the NBFU pamphlet may be obtained upon application to the National Fire Protection Association, 85 Johns Street, New York 38, New York; 22 West Adams Street, Chicago 6, Illinois; or 465 California Street, San Francisco 4, California.)

American Society of Mechanical Engineers

ASME Boiler and Pressure Vessel Code

Section VIII Unfired Pressure Vessels

(Copies of the ASME code may be obtained upon application to the American Society of Mechanical Engineers, 29 West 39th Street, New York, New York.)

Compressed Gas Association

Pamphlet V-1 Inlet and Outlet Connections for Compressed Gas Cylinder Valves

(Copies of the CGA pamphlet may be obtained upon application to the Compressed Gas Association, 11 West 42nd Street, New York 36, New York.)

Consolidated Classification Committee

Uniform Freight Classification Rules

(Application for copies of these freight classification rules should be addressed to the Consolidated Classification Committee, 202 Chicago Union Station, Chicago 6, Illinois.)

American Society of Heating, Refrigerating And Air Conditioning

Safety Code for Mechanical Refrigeration

(Copies of the code may be obtained upon application to the above society at 234 5th Avenue, New York 1, New York.)

3. REQUIREMENTS

3.1 PREPRODUCTION TESTING.- This specification makes provisions for preproduction testing.

3.2 COMPONENTS.- The generating and charging plant shall be a complete, self-contained, electric-powered unit consisting of all air compression, air refrigeration, heat exchange, air rectification, product servicing, and accessory components needed for compliance with the requirements specified herein. Each component shall include all the parts, controls, instruments, and accessories necessary for its safe and effective operation.

3.3 SELECTION OF SPECIFICATIONS AND STANDARDS.- Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with Bulletin 143, except as specified in 3.3.1.

3.3.1 COMMERCIAL PARTS.- Commercial parts having suitable properties may be used where, on the date of invitation for bids, there are no suitable standard parts. In any case, commercial utility parts such as screws, bolts, nuts, and cotter pins having suitable properties may be used provided:

a. They can be replaced by the standard parts (MS or AN) without alteration

b. The corresponding standard part numbers are referenced in the parts list and, if practical, on the contractor's drawings.

3.4 MATERIALS

3.4.1 FUNGUS-PROOF MATERIALS.- Materials that are nutrients for fungi shall not be used where it is practical to avoid them. Where used and not hermetically sealed, they shall be treated with varnish conforming to MIL-V-173. However, if they will be used in a hermetically sealed enclosure, fungicidal treatment will not be necessary.

3.4.2 METALS.- All metallic surfaces of the generating and charging plant that contact high-purity oxygen or liquid nitrogen, or that are in a location where they will normally be chilled to cause condensation of moisture from the atmosphere, shall be fabricated from corrosion-resistant materials that do not require paint or other organic chemical coatings for protection.

3.4.3 GASKETING AND INSULATING MATERIALS.- Plastic, rubberlike, rubber, or similar gasketing and insulating materials shall be compounded to insure their suitability for the intended application and, where applicable, their resistance to hydrocarbons or low temperatures.

3.4.3.1 Packings, gaskets, seals, and other nonmetallic components that come into contact with high-purity oxygen shall be compounded of materials compatible with use in a pure oxygen atmosphere, under the conditions to which they will be subjected, and that are not adversely affected or deteriorated by continued use in an oxygen or nitrogen atmosphere.

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3.4.4 RUBBER GOODS.- Rubber goods such as hoses, seals, insulation or isolation boots, et cetera, shall be fabricated from rubber compounds conforming to MIL-R-3065.

3.4.5 COMBUSTIBLE MATERIALS.- Readily combustible materials shall not be used where they can come into contact with high-purity oxygen.

3.5 GENERAL DESIGN.- The generating and charging plant shall be a compact, oxygen- and nitrogen-producing unit that can be readily erected, operated, and maintained in a 20- by 40-ft bay of a 40-ft wide prefabricated building having:

a. An overall smooth, level, concrete floor capable of supporting a load density of 200 psf, together with special individual foundation provisions as may be necessary for the air compression equipment.

b. Lighting facilities capable of producing sufficient illumination for operating the generating and charging plant at night

c. Heating provisions capable of maintaining the building temperature at 50° F with an outside ambient temperature of -65° F

d. Ventilating provisions capable of maintaining the building temperature at not to exceed 130° F with an outside ambient temperature of 125° F when the generating and charging plant is producing at full capacity

e. A 220-V or a 440-V, 3-phase, 60-cycle, electric power supply system capable of furnishing all electric power required for operation of the generating and charging plant, and

f. A floor-to-eaves height of 14 ft.

3.5.1 Standard, heavy-duty, commercially proven generating and charging plant equipment components shall be used to the maximum practicable extent. The general equipment arrangement in the prefabricated building bay shall be as shown on figure 1. The generating and charging plant components furnished shall not require special mounting provisions other than tiedown bolts for installation on the specified floor.

3.5.2 All electric switchgear, wiring, and lighting equipment (exclusive of building lighting facilities); piping; ducting; controls; instruments; and accessory components needed for installation, operation, and maintenance of the generating and charging plant shall be provided.

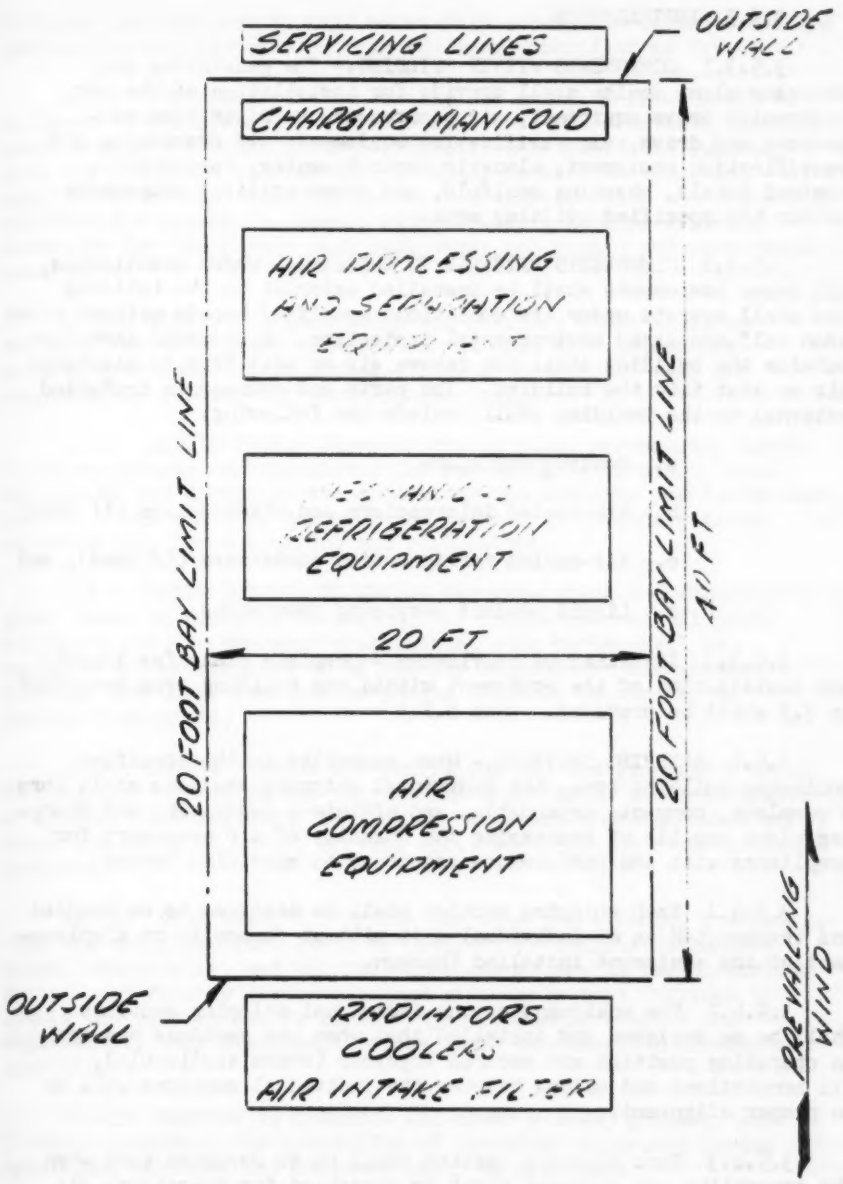


FIGURE 1 EQUIPMENT GENERAL LAYOUT PREFABRICATED BUILDING 20FT x 40FT BAY

3.5.3 INSTALLATION

3.5.3.1 COMPONENTS WITHIN BUILDING.- The generating and charging plant design shall provide for installation of the air compressor drive equipment, air compressor, refrigeration compressor and drive, air purification equipment, air processing and rectification equipment, electric control center, instruments, control panels, charging manifold, and other critical components within the specified building area.

3.5.3.2 COMPONENTS EXTERNAL TO BUILDING.- Where practicable, all other components shall be installed external to the building and shall operate under the conditions specified herein without other than self-contained environmental protection. Components installed outside the building shall not remove air or heat from or discharge air or heat into the building. The parts and components installed external to the building shall include the following:

a. Cooling radiators

b. Air-cooled intercoolers and aftercoolers (if used)

c. Air-cooled refrigeration condensers (if used), and

d. Liquid product servicing provisions.

3.5.3.3 INSTALLATION PROVISIONS.- Complete plans for layout and installation of the equipment within the building area specified in 3.5 shall be provided. (See 6.2.)

3.5.4 SHIPPING SECTIONS.- When assembled in the specified enclosing building area, the individual shipping sections shall form a complete, compact, dependable, and efficient generating and charging plant capable of processing the quantity of air necessary for compliance with the performance requirements specified herein.

3.5.4.1 Each shipping section shall be designed to be handled and transported as an individual unit without damage to or displacement of the equipment installed thereon.

3.5.4.2 The equipment on the individual shipping sections shall be so designed and installed that when the sections are set in operating position and secured together (where applicable), all connections and unions between the individual sections will be in proper alignment.

3.5.4.3 Each shipping section shall be so designed that when the generating and charging plant is assembled for operation, all

controls and instruments will be readily accessible to the operating and maintenance personnel within the space specified in 3.5.

3.5.5 SUPPLIES.- The generating and charging plant shall be designed to perform as specified herein when operated with electric power having the characteristics specified in 3.6.3 and supplied with the specified lubricants. It shall require no operating supplies other than electric power; lubricants; water and antifreeze solution for makeup in closed, radiator-type, cooling systems; chemicals for the purity test apparatus; and repair and maintenance materials.

3.5.6 LIFE.- The generating and charging plant shall be designed for an operational life of not less than 10,000 hrs between overhauls and to minimize loss of production time for maintenance, repair, and periodic servicing.

3.5.7 LUBRICATION.- Wherever practicable, permanently lubricated components, or components not requiring lubrication, shall be used in the design of the generating and charging plant. Grease and oil seals shall be designed and located to provide maximum accessibility for inspection and replacement.

3.5.8 PARTS SUBJECT TO WEAR.- The generating and charging plant shall be designed to provide for lubrication of all parts subject to wear. Wherever practicable, such parts shall be designed and constructed to be readily renewable. All grease fittings and other lubrication points shall be located to be readily accessible.

3.5.9 COMMON PARTS.- The generating and charging plant shall be designed to provide for the maximum practicable interchangeability of hardware and fastening devices by using the minimum number of types and sizes of bolts, screws, nuts, washers, and other common hardware.

3.5.10 DETACHABLE FITTINGS.- Wherever practicable, the generating and charging plant shall be designed to include disconnect plugs, receptacles, and multiple-line connectors in the electrical systems and readily detachable- and attachable-type fittings in liquid and vapor lines to permit rapid component removal and replacement. All disconnect points shall be clearly indicated and identified.

3.5.11 PROTECTIVE COVERS.- All cover plates, gaskets, and fittings necessary for protection of contained apparatus during operation, storage, and shipment shall be provided.

3.6 CONSTRUCTION

3.6.1 COMPONENT MOUNTING.- Generating and charging plant components shall be securely mounted in a manner that will insure against unnecessary movement and damage during operation and transport. All subbases and other fixtures needed for safe and secure component mounting shall be installed.

3.6.1.1 Generating and charging plant component mounting shall be such that the providing of special mounting provisions as part of the building or floor will be unnecessary.

3.6.1.2 All tubing, lines, and electrical wiring shall be located in protected positions, securely fastened to framework or body structures, and provided with protective sleeves, grommets, or similar devices at each point where they pass through members, except where a through-the-frame-type connector is provided.

3.6.2 MAINTAINABILITY.- Components and accessories shall be constructed and installed on each individual skid-mounted shipping section to provide for:

a. Ready accessibility to all parts for operation, maintenance, and repairs in the field

b. The use of conventional, general purpose tools to the maximum practicable extent, and

c. Replacement and adjustment of components and accessories with minimum disturbance to other elements of the equipment.

3.6.2.1 Covers or plates that must be removed to accomplish normal operation and maintenance procedures or for frequent component or part removal shall be equipped with substantial quick-disconnect fittings.

3.6.3 ELECTRICAL EQUIPMENT.- Electrical equipment shall be constructed and installed to insure performance in accordance with the requirements specified herein when the generating and charging plant is supplied with either 220 ± 10 percent volt or 440 ± 10 percent volt, 3-phase, 60 ± 3 cycle ac. All electrical equipment shall be capable of operating at full load on either the specified frequency or the alternate frequency without overheating or damage. All switches, circuit breakers, transformers, motor starting devices, and accessories needed for safe and effective operation of the generating and charging plant shall be provided. Electrical components shall be designed, constructed, and installed in accordance with Pamphlet 70 and the National Electrical Manufacturers' Association standards.

3.6.3.1 OPERATION.- All electrical components shall be designed, constructed, and installed to operate from the electrical power supply specified without requiring electrical power generating equipment or batteries (other than necessary as part of temperature indicating and analysis instruments) as part of the generating and charging plant. Unless otherwise specified by the procuring activity, the electrical equipment shall be connected for operation from a 440-V power supply when the generating and charging plant is delivered.

3.6.3.2 VOLTAGE CONVERSION.- The generating and charging plant electrical equipment shall be constructed and installed to facilitate changing from one voltage range to the other with the least practical amount of disturbance and alteration to components and connections.

3.6.3.2.1 CONVERSION ACCESSORIES.- All overload heater strips and other items needed to convert the equipment for use on 220-V electric power shall be supplied with the generating and charging plant and stored in the electrical control enclosures adjacent to where they will be used.

3.6.3.3 CONTROL VOLTAGE.- The voltage of electrical power provided at all manually actuated pushbutton stations and switches, and for all control circuits used in operating the generating and charging plant shall not exceed 120V.

3.6.3.4 ELECTRIC MOTORS.- Electric motors shall conform to CC-M-636 or CC-M-641, as applicable.

3.6.3.4.1 MOTOR SIZE.- Electric motor size shall be such that the driven load will not exceed the continuous-duty rating of the motor when the equipment is operated under any of the conditions specified herein.

3.6.3.4.2 MOTOR RATING.- Electric motors shall be constructed to operate continuously at full rated load, without damage, under the conditions specified in 3.6.3.

3.6.4 CONTROLS, INSTRUMENTS, AND ACCESSORIES.- All automatic and manual controls, instruments, fittings, safety devices, and accessories needed for safe and efficient operation of the generating and charging plant shall be provided.

3.6.4.1 INSTRUMENTS.- All instruments necessary for indicating the information needed in controlling the equipment and determining its performance shall be grouped into control or instrument panels and securely mounted thereon in positions readily visible and accessible to operation and maintenance personnel.

3.6.4.1.1 LUBRICANT LEVEL SIGHT GLASSES.- Each liquid lubricant reservoir or sump provided on the generating and charging plant components shall be equipped with an oil level sight glass or level indicator securely mounted in a protected position where it will be readily visible to operating and maintenance personnel. Lubricant level sight glasses shall be long or large enough to permit attending personnel to accurately determine the lubricating fluid level in relation to its normal recommended position.

3.6.4.1.2 COLOR MARKING.- The indicating scale of each instrument (pressure gage, differential pressure indicator, temperature indicator, liquid level indicator, et cetera) used for normal operation and control of the generating and charging plant shall be permanently and plainly marked with green and red to show the proper operating and the other-than-proper-operation or danger ranges, respectively.

3.6.4.2 CONTROLS.- Insofar as practicable, all manually operated controls used in normal operation of the generating and charging plant shall be grouped into control panels and located in positions readily visible and accessible to an operator standing at the control panel.

3.6.4.2.1 ELECTRICAL CONTROLS.- Heavy-duty, magnetically operated contactors, overload protection devices, and undervoltage protection devices of applicable power-handling capacity shall be provided for each electric motor. Heavy-duty switches or controls and overload protection devices shall be provided for all other electrically operated components.

3.6.4.2.1.1 ELECTRIC CONTROL CENTER.- Insofar as practicable, electrical controls, switches, and protective devices, including motor starters, transformers, and circuit breakers shall be grouped into an electric control center installed at a location convenient to the operators and maintenance personnel. The electric control center shall include a master shutoff and disconnect switch to control all generating and charging plant electric power, and which will shut down all electrical equipment except building lights when open. The electric control center shall also include provisions for wiring in of the building main power supply and distribution of this power as necessary to all components of the generating and charging plant.

3.6.4.2.2 POSITION INDICATORS.- Manually operated controls that must be closely regulated for generating plant operation shall be equipped with position indicators. The position indicators shall have graduations to permit accurate adjustment of controls to predetermined effective settings.

3.6.5 PARTS FABRICATION.- Sheet-metal parts shall be of sufficient thickness, rigidity, and strength to withstand dents, warping, vibration, radiated heat, et cetera, encountered in service and maintenance and under the conditions specified herein.

3.6.6 LOCKING DEVICES.- Where practicable, all screws, pins, bolts, et cetera, shall be equipped with locking devices. Safety wire, self-locking nuts, cotter pins, lockwashers, et cetera, will be acceptable. Where practicable, lockwashers shall be secured to bolts or screws. Cotter pins shall be fabricated from corrosion-resistant steel or other corrosion-resistant material.

3.6.7 PIPE THREAD COMPOUND.- Pipe thread compound conforming to MIL-T-5542, or other pipe thread sealing material specifically approved by the procuring activity, shall be applied to threads prior to assembly of all threaded fittings subject to contact by oxygen of 30 percent or greater purity.

3.6.8 LIFTING AND TIEDOWN PROVISIONS

3.6.8.1 LIFTING RINGS.- Each shipping section shall be provided with lifting rings in locations that will permit cable attachment and lifting without damage to any component. The lifting rings shall be constructed and installed to permit lifting the shipping section when ready for shipment, considering vertical accelerations of 3 g. The lifting rings shall be so located on the shipping section that transportation personnel can easily rig safe lifting slings from common cable and spreader bar components for lifting by a single-hook, overhead crane.

3.6.8.2 LIFTING EYES.- Lifting eyes or other hoisting attachments shall be provided on major components so that they may be readily removed or replaced with overhead hoisting facilities. Insofar as is practicable, all individual components shall be installed in a manner that will permit their removal without necessity for removing other components.

3.6.9 TRANSPORTABILITY.- Each individual shipping section shall be capable of withstanding like forces as imposed by the flight and taxiing loads specified in MIL-A-8421 when being transported by a truck or trailer, railroad car, or a seagoing vessel.

3.6.10 PRESSURE RELIEF DEVICES.- Pressure relief devices shall be provided in any line or component that can be so isolated by closing valves, or otherwise, that dangerous pressures could develop. Relief valves shall be provided for normal relief of pressure. All pressure relief devices shall be installed in readily

accessible locations. Provisions shall be incorporated to insure discharge of pressure without damage to equipment or danger to personnel. Safety valves shall be sized in accordance with the ASME Unfired Pressure Vessel Code and selected from the list published in Safety Valves and Relief Valves Approved by the National Board.

3.6.10.1 BLOWOUT-TYPE SAFETY HEADS.- Blowout-type safety heads may be provided where pressure will not normally have to be relieved, but where protection is necessary, such as for the air processing and separation equipment insulated casings.

3.7 PERFORMANCE

3.7.1 PRODUCTION CAPACITY.- When operating at sea level atmospheric pressure (760 mm Hg), in an ambient temperature (outside the enclosing building) of 70° F, with the intake cooling and process air relative humidity at 50 percent, and with the intake process air contaminated as specified in table I, the generating and charging plant shall be capable of continuously delivering liquid product through the servicing lines specified in 3.10.4 and gaseous product through the charging manifold assemblies specified in 3.11.3 at a daily average of not less than the rates specified in table II. Liquid delivery rates shall be based on the quantity of product accumulated in a container maintained at atmospheric pressure.

TABLE I

INTAKE PROCESS AIR IMPURITIES

| | Parts Per Million |
|---|---|
| Carbon dioxide | 1,000 |
| Carbon monoxide | 50 |
| Ethylene | 4 |
| Propane | 3 |
| Butane | 2 |
| Hydrogen sulfide | 1 |
| Sulfur oxides | 1 |
| Acetylene | 1 |

TABLE II

DELIVERY CAPABILITIES

| | Oxygen Liquid | Oxygen Gas | Nitrogen Liquid | Nitrogen Gas |
|---|---|---|---|---|
| Production capacity | 125 lb/hr | 1,600 SCFH[1] | 84 lb/hr | 1,150 SCFH[1] |
| Delivery pressure | 0-100 psig | 0-3,500 psi | 0-100 psig | 0-3,500 psi |

[1]SCFH - Standard (760 mm Hg, 70° F) cubic feet per hour

3.7.1.1 NITROGEN PRODUCT DELIVERY.- The generating and charging plant shall be capable of continuously delivering nitrogen product alone for extended periods of time without endangering the safety of equipment or personnel.

3.7.1.2 CONCURRENT PRODUCT DELIVERY.- The generating and charging plant shall be capable of concurrently delivering liquid product from the servicing lines specified in 3.10.4 and gaseous product from the charging manifold assemblies specified in 3.11.3, as follows:

a. Liquid oxygen at 3 psig and gaseous oxygen at 3,500 psi

b. Liquid oxygen at 3 psig and gaseous nitrogen at 3,500 psi

c. Liquid oxygen at 100 psig and gaseous nitrogen at 3,500 psi

d. Liquid nitrogen at 3 psig and gaseous nitrogen at 3,500 psi

e. Liquid nitrogen at 3 psig and gaseous oxygen at 3,500 psi

f. Liquid nitrogen at 100 psig and gaseous oxygen at 3,500 psi

g. Liquid oxygen at 3 psig and liquid nitrogen at 3 psig

h. Liquid oxygen at 3 psig and liquid nitrogen at 100 psig

i. Liquid oxygen at 100 psig and liquid nitrogen at 3 psig

j. Liquid oxygen at 100 psig and liquid nitrogen at 100 psig

k. Gaseous oxygen at 3,500 psi and gaseous nitrogen at 3,500 psi

3.7.1.2.1 During concurrent production, the generating and charging plant shall be capable of delivering each product at a rate reduced from the capacities specified in 3.7.1 by not more than the percentage of full capacity at which the other is delivered.

3.7.1.3 PRODUCT QUALITY

3.7.1.3.1 LIQUID OXYGEN.- Liquid oxygen product shall conform to the type II requirements specified in MIL-O-27210.

3.7.1.3.2 GASEOUS OXYGEN.- Gaseous oxygen product shall conform to the type I requirements specified in MIL-O-27210.

3.7.1.3.3 LIQUID NITROGEN.- Liquid nitrogen product shall conform to the type II, class 1, grade B requirements specified in BB-N-411.

3.7.1.3.4 GASEOUS NITROGEN.- Gaseous nitrogen product shall conform to the type I, class 1, grade B requirements specified in BB-N-411.

3.7.1.3.5 HYDROCARBON CONTAMINATION.- Oxygen or nitrogen product total hydrocarbon contamination, excluding methane, shall not exceed 10 parts per million by volume, expressed as methane equivalent.

3.7.1.3.6 ACETYLENE CONTAMINATION.- Oxygen or nitrogen product acetylene contamination shall not exceed 0.5 parts per million.

3.7.1.3.7 CARBON DIOXIDE CONTAMINATION.- Oxygen or nitrogen product carbon dioxide contamination shall be controlled to insure the endurance specified in 3.7.3.2 without blocking of the product filters.

3.7.1.4 DELIVERY TEMPERATURE.- The liquid oxygen and liquid nitrogen shall be delivered from the liquid servicing lines specified in 3.10.4 at temperatures that will insure compliance with the requirements of 3.7.1 through 3.7.1.2.1 when the production rate is measured with the liquid at atmospheric temperature.

3.7.1.5 DELIVERY PRESSURE.- The generating and charging plant shall be capable of continuously maintaining the maximum product discharge pressures specified in 3.7.1 and 3.7.1.2 during operation under the conditions specified herein.

3.7.2 POWER CONSUMPTION.- When operating under the conditions specified in 3.7.1, the generating and charging plant shall deliver

not less than 1 lb of liquid oxygen through the liquid servicing line specified in 3.10.4 for each kilowatt hour of total electric power consumed by all generating and charging plant equipment. The weight of liquid oxygen delivered shall be measured with the liquid at atmospheric pressure.

3.7.3 OPERATION

3.7.3.1 STARTING.- When all generating and charging plant components are initially at the temperature specified in 3.7.1, the equipment shall be capable of cooling down and achieving full rated production within 5 hrs after starting the air compressor.

3.7.3.2 ENDURANCE.- The generating and charging plant shall be capable of not less than 30 days continuous production without necessity for plant thaw. Thaw of individual plant components such as heat exchangers will be permitted after a 10-day period of operation if such a thaw does not reduce average production below the rates specified in 3.7.1 and 3.7.1.2. Reactivation of carbon dioxide filters and similar periodic normal operational procedures shall not be affected by this requirement. During a 30-day continuous production period, a shutdown of 1 hr total out of each 24 hrs (1 hr each calendar day) will be permitted for lubrication, adjustments, minor repairs, inspection, and preventive maintenance.

3.7.3.2.1 RESTART TIME.- Upon resuming operation after the permitted shutdown period, the generating and charging plant shall be capable of resuming rated production within an additional 60 min or an additional time equal to the length of the shutdown, whichever is less.

3.7.3.3 THAWING.- Upon completion of a 30-day production period, the generating and charging plant shall be capable of being completely thawed, serviced, and inspected, ready for another 30-day production period, within 12 hrs.

3.7.4 ENVIRONMENTAL CONDITIONS.- The generating and charging plant shall be capable of operating under and withstanding the following environmental conditions without damage:

3.7.4.1 OPERATING TEMPERATURE.- The generating and charging plant shall be capable of starting and operating continuously at normal (not necessarily rated) production when the ambient temperature (outside the enclosing building) is between -65° and +125° F, including exposure to solar radiation of 100 to 120 watts per square foot at the higher temperature.

3.7.4.2 HUMIDITY.- The generating and charging plant shall not be damaged by storage or operation in relative humidities

up to and including 100 percent, including conditions wherein condensation takes place in the form of water and frost.

3.7.4.3 FUNGUS.- The generating and charging plant shall not be damaged by exposure to fungus growth such as encountered in tropical and subtropical climates.

3.7.4.4 SALT ATMOSPHERE.- The generating and charging plant shall not be damaged by operation or storage in an atmosphere containing salt-laden moisture such as encountered near bodies of salt water and in transportation on shipboard.

3.7.4.5 RAIN.- The generating and charging plant components installed external to the building shall not be damaged by operation or storage under heavy rainfall as encountered in any locale.

3.7.4.6 SAND AND DUST.- The generating and charging plant shall not be damaged by operation or storage in an atmosphere containing airborne sand and dust particles such as encountered in desert locations.

3.7.4.7 WIND.- The generating and charging plant components installed external to the building shall not be damaged by wind velocities of up to and including 125 mph.

3.8 AIR COMPRESSION EQUIPMENT.- The air compression equipment shall function to supply the compressed air needed in the generating and charging plant separation cycle. The air compression equipment shall be a complete, self-contained assembly requiring only electric power supply, lubricants, and cooling-system filling fluid for operation.

3.8.1 The air compression equipment shall consist of a single air compression unit including an electric motor prime mover, a heavy-duty air compressor, intercoolers, aftercooler, radiators, moisture separators, controls, instruments, piping, and all other auxiliary equipment necessary for proper operation. The air compression unit shall be so designed, constructed, and connected to the other equipment that when operating it will be a complete, compact, and efficient assembly capable of continuously supplying the generating and charging plant air processing and separation equipment with compressed air of the proper purity, volume, temperature, and pressure for compliance with the production requirements specified in 3.7.1 through 3.7.1.5.

3.8.2 MOUNTING.- The complete air compression unit, including its prime mover, compressor, intercoolers, aftercooler, controls,

instruments, piping, and auxiliary equipment shall be mounted on one or more shipping skids ready for installation on the concrete floor specified in 3.5.

3.8.2.1 ALIGNMENT.- Provisions shall be made for proper alignment of the air compression equipment components on each skid after installation.

3.8.3 PRIME MOVER.- The electric motor prime mover shall be a single, continuous-duty electric motor designed and constructed to operate on the electric power specified in 3.6.3 and to furnish the motive power required for operation of the air compressor under the conditions specified herein. The motor size shall be such that the total driven load, including losses in the power transmission system, during normal operation of the generating and charging plant under any of the conditions specified herein will not exceed its continuous (24 hrs per day) output horsepower rating.

3.8.3.1 MOTOR CONTROL.- A reduced voltage, magnetically operated control meeting the requirements of NEMA Publication IC1 shall be provided for starting and stopping the electric motor prime mover. The motor control shall be equipped with overload protection and undervoltage protection devices of applicable power-handling capacity. The motor control contacts shall pick up and seal at 80 percent of rated voltage or above, and shall not drop out above 60 percent of rated voltage.

3.8.3.2 CONTROL STATIONS.- Electric motor prime mover magnetic contactor start and stop button stations shall be mounted in readily visible and accessible locations on the generating and charging plant electric control center, on or near the air processing and separation equipment control panel, and on or near the air compression unit instrument panel. The control station on the air processing and separation equipment control panel or on the air compression unit instrument panel may be omitted if the electric control center is located immediately adjacent thereto and is readily accessible to an operator standing at the instrument or control panel.

3.8.4 POWER TRANSMISSION SYSTEM.- A power transmission system capable of efficiently transmitting power from the prime mover to the air compressor shall be provided. If V-belt drive is used, provisions for adjusting the belt tension by changing the distance between centers of the driving and driven shafts shall be incorporated. Jackscrews shall be provided as necessary in the base and slide-rail assemblies to facilitate this adjustment.

3.8.5 AIR COMPRESSOR.- The air compressor shall be a single, heavy-duty, commercial-type machine of a design and construction that

has previously demonstrated a continuous full-load operational capability of not less than 8,000 hrs uninterrupted duty without necessity for shutdown. The ratio of piston speed in feet-per-minute divided by the piston stroke in inches shall not exceed a value of 115, and the maximum allowable piston speed shall be 700 fpm. The air compressor shall be equipped with all manual and automatic controls, instruments, filters, lubricating systems, cooling systems, and other accessories needed to insure safe and effective operation during extended periods of continuous usage.

3.8.5.1 LUBRICATING SYSTEM.- The air compressor shall be equipped with a self-contained, positive pressure lubricating system capable of thoroughly lubricating all rubbing parts requiring lubrication under the conditions specified herein.

3.8.5.1.1 LUBRICATING OIL.- The air compressor shall perform as specified herein when supplied with lubricating oil conforming to MIL-L-2104 or MIL-L-26087.

3.8.5.1.2 UPPER CYLINDER LUBRICATION.- If required for lubrication of high-pressure cylinders, a standard commercial-type, force-feed lubricator shall be provided. This lubricator shall be driven from a compressor shaft or other positive-acting mechanism.

3.8.5.1.3 UPPER CYLINDER LUBRICATING FLUID.- The upper cylinder lubricating fluid shall be of the type and viscosity grade specified by the air compressor manufacturer.

3.8.5.2 COOLING SYSTEM.- The air compressor shall be equipped with a complete liquid-type cooling system, including jacketed cylinders and heads, capable of preventing overheating of the air compressor when it is operated continuously at full load and maximum discharge pressure in an ambient temperature of +125° F (outside the building). The cooling system shall function in accordance with the requirements specified herein when filled with antifreeze that will insure the coolant remaining fluid at -65° F. The cooling system shall not use air from inside the building nor discharge air or heat inside the building.

3.8.5.2.1 The cooling system shall include all air-cooled radiators, liquid-cooled oil coolers, coolant pumps, automatic control valves (including an automatic coolant-temperature control valve), and other accessories needed to insure safe and effective operation. A manually operated bypass shall be provided to permit manual control in case of failure of the automatic temperature control valve.

3.8.5.3 FILTERS.- The air compressor shall be equipped with intake process air, lubricating oil, and cooling system fluid filters capable of protecting the air compressor components from harmful solid particles.

3.8.5.3.1 INTAKE PROCESS AIR FILTER.- The intake process air filter shall be a heavy-duty, oil-bath- or dry-type unit capable of insuring the removal of harmful particles from the process air before it enters the air compressor. The intake process air filter shall include provisions that will insure its effectiveness when used in cold climates where oil will not remain fluid for proper operation, and shall permit ready cleaning or changing of the filter elements when needed.

3.8.5.3.1.1 The intake process air filter shall include all connections, fittings, ducting, and mounting brackets necessary for inducting the process air either from outside the enclosing building at a level not less than 15 ft above the floor, or from within the building, at the discretion of the operating personnel.

3.8.5.3.2 LUBRICATING OIL FILTERS.- The lubricating oil filters shall be capable of separating harmful foreign matter from the lubricating oil.

3.8.5.3.3 COOLING SYSTEM FILTERS.- Cooling system filters or strainers shall be provided in the cooling system wherever necessary to prevent solid particles from plugging any component.

3.8.5.4 INSTRUMENTATION.- The air compressor shall be equipped with all instruments needed for determining whether it is operating properly. The instruments shall be of the back-connected, flush-mounted type. They shall be mounted on the air compressor instrument panel in positions readily visible and accessible to operating and maintenance personnel. The instruments provided shall include the following:

3.8.5.4.1 PRESSURE GAGES.- Pressure gages having dial diameters of not less than 4 in. shall be provided to indicate the process air discharge pressure for each compression stage and the aftercooler discharge pressure. Each gage shall have an indicating range of approximately 1-1/2 times the normal working pressure. Gages subject to pressures in excess of 100 psi shall have safety backs.

3.8.5.4.1.1 Pressure gages shall be provided to indicate the air compressor lube oil pressure and the coolant pump discharge pressure. Unless maximum pressures necessitate a higher range to prevent the indicator from moving off scale, each gage shall have an indicating range of approximately 1-1/2 times the normal working pressure. Gages subject to pressures in excess of 100 psi shall have safety backs.

3.8.5.4.1.2 A differential pressure measuring instrument having a dial diameter of not less than 2-1/2 inches or a vertical scale length of not less than 5 inches shall be provided to indicate the pressure drop across the process air inlet filter.

3.8.5.4.1.3 PULSATION SNUBBERS.- A pulsation snubber shall be provided for each pressure gage subjected to pressure pulsations that would otherwise make the gage difficult to read, or that would possibly cause premature gage failure.

3.8.5.4.2 TEMPERATURE INDICATORS.- Dial-type temperature indicators shall be provided for indicating the following temperatures:

a. Process air entering each compression stage

b. Process air leaving each compression stage

c. Process air leaving the aftercooler

d. Coolant temperature into compressor from radiator

e. Coolant temperature from compressor to radiator

f. Lube oil temperature into cooler, if applicable

g. Lube oil temperature from cooler, if applicable.

3.8.5.4.3 ELAPSED TIME INDICATOR.- An elapsed time indicator (hourmeter) with a range of not less than 0 to 9,999 hrs shall be provided for indicating the air compression equipment operating time.

3.8.6 ALARM SYSTEM.- The air compression equipment shall be provided with an alarm system that will produce visible and audible warnings in case any of the following conditions arise:

a. Low compressor oil pressure

b. High compressor coolant temperature

c. High aftercooler discharge temperature

d. Process air in coolers approaching freezing point of water.

3.8.7 PROCESS AIR COOLERS.- The air compression unit shall be equipped with a complete, self-contained, air-cooled process-air cooling system consisting of an intercooler between each two compression stages, an aftercooler following the final compression

stage, and a moisture separator for each cooler. Automatic shutters or other automatic provisions that will maintain the process air temperature at a level that will prevent freezing of contained water and water vapor in the coolers or moisture separators during low-temperature operation shall be provided.

3.8.7.1 COOLING CAPACITY.- Each intercooler and aftercooler shall be capable of insuring a discharge temperature not in excess of 20° F warmer than the ambient temperature, but not less than 35° F, when the generating and charging plant is operated under any of the conditions specified herein.

3.8.7.2 INSTALLATION.- The process air coolers shall be installed with all air-cooled heat exchange surfaces completely external to the building so that air or heat will not be removed from or discharged into the building.

3.9 AIR PROCESSING AND SEPARATION EQUIPMENT.- The air processing and separation equipment shall be designed and constructed to receive compressed air from the air compression equipment, and to separate therefrom oxygen product and nitrogen product as necessary for compliance with 3.7.1 through 3.7.1.5.

3.9.1 The air processing and separation equipment shall consist of the heat exchangers, refrigeration systems, air purification systems, expansion engines (if applicable), air rectification columns, product delivery provisions, hydrocarbon and other adsorbent traps, controls, instruments, and accessories necessary for compliance with the requirements specified herein.

3.9.1.1 MECHANICAL REFRIGERATION EQUIPMENT.- Mechanical refrigeration equipment furnished as part of the generating and charging plant shall be designed, constructed, and installed in accordance with the ASRE Safety Code for Mechanical Refrigeration. Any refrigeration system used shall include its own drive, compressors, coolers, condenser, oil traps, evaporator, liquid refrigerant receiver, refrigerant driers, and all controls, instruments, and accessories needed for safe and efficient operation.

3.9.1.1.1 LIQUID REFRIGERANT RECEIVER.- The liquid refrigerant receiver for any mechanical refrigeration system furnished shall be capable of storing the entire refrigerant system refrigerant charge when the generating and charging plant components are stabilized at 160° F.

3.9.1.1.2 OIL RETURN PROVISIONS.- Any mechanical refrigeration system with an oil lubricated compressor shall be equipped with oil traps or other provisions as necessary to remove the maximum practical amount of oil from the refrigerant before it passes to the evaporator

and other components operating at low temperatures. Means shall be provided for returning oil from the oil traps and from the evaporator to the compressor oil reservoir.

3.9.1.1.3 DRIERS.- A desiccant-type drier capable of removing moisture from the liquid refrigerant before it passes to the refrigeration system low temperature components shall be included as part of any mechanical refrigeration system provided.

3.9.2 THAWING PROVISIONS.- The air processing and separation equipment shall include all provisions necessary for thawing if deposits of ice, solid carbon dioxide, or other substances in the process and effluent passages cause excessive pressure drops during generating and charging plant operation. Thawing shall require no power or facilities external to the generating and charging plant installation other than the electric service specified in 3.6.3.

3.9.3 INSULATED CASINGS.- All air processing and separation equipment components that normally operate at low temperatures shall be mounted and enclosed within insulated casings for protection and reduction of heat transfer to the components.

3.9.3.1 EQUIPMENT SUPPORTS.- The insulated casings shall be provided with supports designed to thermally insulate the enclosed equipment from the casing suspension fittings and to retain this equipment in its proper position under all conditions of service. Provisions shall be incorporated to insure protection for the equipment surfaces from damage caused by relative movement of components as a result of temperature variations and stresses that occur during operation and transport.

3.9.3.2 SIZE.- The casings shall be large enough to permit installation of insulation for preventing unnecessary heat leakage to the enclosed equipment.

3.9.3.3 ASSEMBLY.- The casings shall be constructed so that when the air processing and separation equipment individual shipping packages are set in place, the cabinet openings provided for pipe and other connections between insulated casings and assemblies will fit together to provide tight joints, and so that the piping and other connections will be properly aligned.

3.9.3.3.1 Interconnecting piping between insulated casings shall be insulated to insure against unnecessary heat leak.

3.9.3.3.2 Case openings for piping connections between insulated casings shall be large enough to permit installing enough insulation between the piping joints and the casing metal to insure against unnecessary heat leak.

3.9.3.3.3 SHIPPING COVERS.- The casing openings for interconnecting piping shall be provided with tight-fitting shipping covers to protect the piping connections, and to prevent the entrance of dirt and moisture.

3.9.3.4 REMOVABLE PANELS.- The casings shall be constructed with removable panels located and of such size as to permit ready access to the enclosed equipment for inspection, maintenance, and repair.

3.9.3.4.1 SEALING.- Each panel shall be provided with a sealant for preventing flow of air through the panel joints when the generating and charging plant components change temperature. Panel attachment screws or bolts shall be spaced to insure maintaining good contact between the panel, sealant, and casing at all points under any of the conditions specified herein.

3.9.3.5 RELIEF VENT.- Each casing shall be equipped with a relief vent to prevent excessive pressure from building up inside. The vent shall be capable of relieving the full gas discharge capacity of the enclosed components in case of rupture without exceeding the safe internal pressure for the casing.

3.9.3.6 INSULATION.- All space within each casing not occupied by equipment or structural members shall be packed with insulation of a type that is not flammable and that does not readily absorb moisture. The insulation shall be of such a texture that it can be readily removed and replaced by maintenance personnel in the field without the use of special equipment.

3.9.3.7 AIR BLEEDS.- Air bleeds designed for maintaining a slight positive pressure within the insulated casings by using dry air or nitrogen from the process air or waste nitrogen streams shall be provided.

3.9.4 INSTRUMENTS AND CONTROLS

3.9.4.1 All normally used operating controls and instruments shall be readily accessible to operating and maintenance personnel without removal of cover plates or panels. Insofar as practicable, controls and instruments shall be so designed and installed that all cold portions are within the insulated casings.

3.9.4.1.1 Controls and instruments shall be so installed that air leaks through or around the installations will be effectively prevented.

3.9.4.1.2 Only materials that offer considerable resistance to heat flow shall be used to connect internal parts with those extending outside the insulated casings.

3.9.4.2 CONTROL VALVES.- All control valves needed for control of the air processing and separation equipment shall be provided.

3.9.4.2.1 Wherever practicable, the control valves shall be solidly mounted on the air processing and separation equipment control panels in positions readily visible and accessible to the operating and maintenance personnel. Valves that cannot be mounted on the control panels shall be mounted in readily accessible locations as near the control panels as practicable.

3.9.4.2.2 VALVE POSITION INDICATORS.- All control valves that require setting at some definite position between closed and fully open shall be provided with valve position indicators to permit accurate adjustment to predetermined proper settings.

3.9.4.3 SAFETY DEVICES.- All safety devices, including automatic warning signals, automatic shutdown devices, et cetera, necessary for protection of the air processing and separation equipment against damage in operation shall be provided.

3.9.4.3.1 SAFETY VALVES.- Pop-type safety valves shall be installed in all pressure vessels and lines where a dangerous buildup of pressure could occur. Safety valves handling high-purity oxygen or nitrogen shall be so located and installed that discharge therefrom can be readily piped outside the building.

3.9.4.3.1.1 SAFETY VALVE MOUNTING.- Insofar as practicable, the safety valves shall be grouped in one general location on the air processing and separation equipment, and shall be mounted where they are readily accessible for inspection and maintenance and protected against mechanical damage. The safety valve outlet openings shall be so located and directed that the safety valves will not discharge toward areas normally occupied by operating or maintenance personnel or personnel standing at any of the generating and charging plant operating and control panels.

3.9.4.4 INSTRUMENTATION.- All instruments necessary for indicating the temperatures, pressures, liquid levels, and rates used in controlling the generating and charging plant and determining its performance shall be provided. Instruments shall be of the back-connected, flush-mounted type. They shall be securely mounted on the generating and charging plant control panels in positions readily visible and accessible to operating and maintenance personnel.

3.9.4.4.1 Pressure gages shall be provided to indicate all pressures necessary for safe and effective operation, servicing, and maintenance of the generating and charging plant.

3.9.4.4.1.1 Pressure gages used for indicating critical pressures such as the air pressure from the compressor, air pressure to and from the expansion engine (if used) and expansion valves, air pressure to and from the heat exchangers, column pressures, et cetera, shall conform to MIL-G-18997, shall have dial diameters of not less than 4 inches, and shall be accurate to within 1 percent of full-scale range.

3.9.4.4.1.2 Pressure gages used for indicating noncritical pressures shall conform to MIL-G-18997, shall have dial diameters of not less than 2-1/2 inches, and shall be accurate to within 2 percent of full-scale range.

3.9.4.4.1.3 PRESSURE GAGE RANGE.- The indicating range of each pressure gage shall be approximately 1-1/2 times the normal working pressure unless maximum pressures necessitate a higher range to prevent the indicator moving off scale. Each gage shall be graduated in pounds per square inch over approximately 270° of the dial face. Gages subject to pressures in excess of 100 psi shall have safety backs.

3.9.4.4.1.4 A pulsation snubber shall be provided for each pressure gage subjected to pressure pulsations that would otherwise make the gage difficult to read, or that would possibly cause premature gage failure.

3.9.4.4.1.5 SHUTOFF VALVES.- Each of the air processing and separation equipment pressure gages shall be equipped with a shutoff valve that may be throttled to dampen out excessive pulsations of the pressure and that may be completely closed to seal off the line if the gage must be removed during generating and charging plant operation.

3.9.4.4.2 LOW-TEMPERATURE LIQUID LEVEL GAGES.- Each gage used for indicating the level of a low-temperature liquid shall be a differential-pressure-type gage with a dial diameter of not less than 6 inches. Each gage shall be equipped with a zero-setting correction device.

3.9.4.4.3 Industrial-type dial thermometers with dial diameters of not less than 3 inches, thermocouples, or resistance bulbs, as applicable, shall be provided wherever needed for determining the temperatures used in operating the generating and charging plant air processing and separation equipment.

3.9.5 LIQUID PRODUCT DELIVERY PROVISIONS.- The generating and charging plant air processing and separation equipment shall include separate liquid product delivery provisions for each of the two liquid products.

3.9.5.1 The liquid product delivery provisions for each product shall consist of the piping, flow control and shutoff valves, pumping equipment provisions and connections, product filter, and liquid product delivery connection necessary for compliance with the requirements specified herein. Insofar as practicable, all components shall be so designed and installed that all cold portions are within the insulated air separation equipment cold-box casings.

3.9.5.2 PRODUCT FILTER.- The liquid product delivery provisions for each product shall include a filter through which all liquid dispensed from the liquid product delivery connection must pass. Each filter shall remove 98 percent, by weight, at operating conditions of all particles whose two smallest dimensions are 40 microns or greater (40 micron nominal rating). Each filter shall further remove all particles whose two smallest dimensions are 72 microns or greater (72 microns absolute rating).

3.9.5.2.1 Each filter shall be a multilayer, stainless-steel, wire-wound type or a stainless-steel, wire-mesh, cloth type in which the wires have been fused under controlled conditions and which has a thickness that will insure the specified performance. The filter elements shall be fused to their filter housings in a manner that will insure against the product bypassing the filter element.

3.9.5.2.2 Each product filter shall be installed in a location where it will be accessible for inspection and cleaning, and shall be insulated as necessary to insure the minimum practicable product evaporation loss.

3.9.5.3 LIQUID PRODUCT DELIVERY CONNECTIONS.- Separate insulated liquid-oxygen and liquid-nitrogen product delivery connections shall be provided on the air processing and separation equipment in protected positions readily accessible for installation of the liquid product delivery lines specified in 3.10.2. The liquid product delivery connections shall be equipped with fittings that will provide for ready and leaktight attachment and ready removal of the liquid product delivery lines, and which are so different that direct connection of the oxygen delivery line to the nitrogen delivery connection or of the nitrogen delivery line to the oxygen delivery connection will be impossible.

3.9.5.3.1 Each liquid product delivery connection shall be mounted on an insulated plate that will prevent strain on the delivery piping within the air processing and separation equipment during attachment or removal of the liquid product delivery line or while the line is attached. The insulating plate shall be of such size and construction as to insure the minimum practicable heat transfer from structural members, the cabinet casing, or other warm parts to the connection.

3.9.5.3.2 PROTECTIVE CAP.- Each liquid product delivery connection shall be provided with a protective cap or plug that will tightly close and protect the connection when the liquid product delivery line is not installed. Each protective cap or plug shall be attached to its fitting by a chain or other device to protect against accidental loss.

3.9.6 GAS CHARGING EQUIPMENT.- The generating and charging plant shall include the apparatus, attachments, and accessories necessary for charging oxygen and nitrogen gas into storage containers at any pressure up to and including 3,500 psi as specified in 3.7.1 through 3.7.1.2.1. Separate and distinct gas charging equipment shall be provided for oxygen gas and for nitrogen gas to insure against mixing or mistaking the product being charged.

3.9.6.1 The gas charging equipment for each product shall operate by passing the liquid product from the air separation equipment through a pump inlet filter, pumping the liquid to the necessary pressure, passing the high-pressure liquid through a pump discharge filter and the product vaporizing and warming passages of the air processing and separation equipment heat exchangers and charging the high-pressure gas into storage containers through the gaseous product servicing systems specified in 3.11.

3.9.6.2 The gas charging equipment for each product shall consist of a liquid pump inlet filter, a high-pressure liquid pump, a liquid pump discharge filter, product vaporizing and warming passages in the air processing and separation equipment heat exchangers, a gaseous product delivery connection, and the piping, valves, fittings, connections, and accessories necessary for operation in accordance with the requirements specified herein.

3.9.6.3 LIQUID PUMP INLET FILTER.- A filter or screen designed and constructed to provide for ready cleaning or replacement of the element and capable of removing harmful metal, dirt, and other particles before they can enter the liquid pump shall be provided in the liquid pump inlet line.

3.9.6.3.1 The liquid pump inlet filter shall be installed in a location where it will be readily accessible for inspection and cleaning without disassembly or removal of the liquid pump or other components.

3.9.6.4 LIQUID PUMP.- Each high-pressure liquid pump shall be a positive-displacement-type unit capable of handling liquid oxygen or liquid nitrogen and complying with the performance requirements specified herein.

3.9.6.4.1 The liquid pump shall be designed, constructed, and installed with thermal barriers that will permit the drive mechanism and bearings to operate at temperatures suitable for proper lubrication and long life when the pump head is continually at liquid oxygen or liquid nitrogen temperature. The design, construction, and installation of the liquid pump shall also provide for:

a. Automatic lubrication of all parts requiring same by a self-contained lubrication system. Lubrication reservoirs

or sumps shall be of sufficient capacity to insure a sufficient supply of lubricant under all conditions of operation without necessity for frequent additions.

b. Ready inspection, servicing, adjustment, disassembly, repair, and replacement of components under field conditions.

c. Ready detection and correction of packing or seal leakage.

d. Operating packings, seals, shafts, and other moving parts under conditions that will insure against condensation and freezing of water where it will damage packings or seals or interfere with liquid pump operation.

e. Ready adjustment of pump packing while it is in operation (if a packed-type pump is used).

f. Readily changing the pumping capacity by varying the pump stroke or speed.

3.9.6.4.1.1 Fabrication, assembly, and installation of the liquid pump and each of its parts shall be such as to insure operation at full rated capacity without damage, leakage, breakage, cracking, loosening, distortion, or deterioration due to physical stresses.

3.9.6.4.1.2 The liquid pump shall be constructed of materials not attacked or adversely affected by contact with liquid oxygen, gaseous oxygen, liquid nitrogen, gaseous nitrogen, water, moist air, or cleaning solvents such as trichlorethylene or carbon tetrachloride.

3.9.6.5 LIQUID PUMP DISCHARGE FILTERS.- Each liquid pump installation shall include a filter through which all product dispensed from the liquid pump must pass. Each filter shall remove 98 percent, by weight, at operating conditions of all particles whose two smallest dimensions are 10 microns or greater (10 micron nominal rating). Each filter shall further remove all particles whose two smallest dimensions are 40 microns or greater (40 micron absolute rating).

3.9.6.5.1 Each filter shall be a multilayer, stainless-steel, wire-wound type or a stainless-steel, wire-mesh, cloth type in which the wires have been fused under controlled conditions and which has a thickness that will insure the specified performance. The filter elements shall be fused to their filter housings in a manner that will insure against the product bypassing the filter element.

3.9.6.5.2 Each product filter shall be installed in a location where it will be accessible for inspection and cleaning without disassembly of the pump or other components.

3.9.6.6 PRODUCT VAPORIZING AND WARMING HEAT EXCHANGER PASSAGE.- A product vaporizing and warming passage shall be provided in the air processing and separation equipment heat exchangers for vaporizing the liquid product and warming it to approximately atmospheric temperature by heat exchange with process gases to recover the available refrigeration effect.

3.9.6.7 GASEOUS PRODUCT DELIVERY CONNECTIONS.- Separate gaseous oxygen and gaseous nitrogen product delivery connections shall be provided on the air processing and separation equipment in protected locations readily accessible for installation of the gaseous product delivery lines specified in 3.11.2. The gaseous product delivery connections shall be equipped with fittings that will provide for ready and leaktight attachment and ready removal of the gaseous product delivery lines, and which are so different that direct connection of the oxygen delivery line to the nitrogen delivery connection or of the nitrogen delivery line to the oxygen delivery connection will be impossible.

3.9.6.7.1 Each gaseous product delivery connection shall be mounted to prevent strain on the gas charging equipment piping during attachment or removal of the gaseous product delivery line, or while the line is attached.

3.9.6.7.2 Each gaseous product delivery connection shall be provided with a protective cap or plug that will tightly close and protect the connection when the gaseous delivery line is not installed. The protective cap or plug shall be attached to the connection fitting by a chain or other device to protect against accidental loss.

3.9.6.8 CONTROLS, INSTRUMENTS, AND SAFETY DEVICES.- All controls, instruments, safety devices, and accessories necessary for proper and safe operation of the gas charging equipment shall be provided.

3.9.6.8.1 PUMP DRIVE CONTROL.- Controls for starting, stopping, and changing the delivery rate of each liquid pump shall be provided in locations readily accessible to the generating and charging plant operating and maintenance personnel.

3.9.6.8.2 VALVES.- All valves necessary for operation and control of the gas charging equipment shall be provided.

3.9.6.8.2.1 All valves used during gaseous charging shall be mounted where they will be readily accessible to the generating and charging plant operation and maintenance personnel. Installation shall be such that the personnel will be protected from liquid spray or high-pressure jets if a fitting or coupling leaks or breaks.

3.9.6.8.3 HIGH-PRESSURE SAFETY CONTROL.- Each liquid pump assembly shall be provided with a high-pressure safety control that will operate a red light warning signal on the air processing and separation equipment control panel if the pump discharge pressure exceeds the set limit. Each high-pressure safety control shall have an adjustment range of 2,000 through 3,500 psi, inclusive, and shall be easily adjustable by turning a control knob on the control panel. The high-pressure safety controls shall be accurate to within 5 percent of the indicated settings.

3.9.6.8.4 Pressure gages conforming to MIL-G-18997 and having dial diameters of not less than 4 in. shall be provided for indicating the high-pressure liquid pump discharge pressure and the pressure at the gaseous product delivery connection. The gages shall be designed for flush mounting, shall be graduated over approximately 270° of the dial face, and shall be accurate to within 1 percent of full-scale range. The gages shall have safety backs.

3.9.6.8.4.1 RANGE.- The pressure gages shall have ranges of approximately 1-1/2 times their normal working pressure.

3.9.6.8.4.2 The pressure gages shall be mounted on the generating and charging plant air processing and separation equipment control panel in locations readily visible and accessible to the operating and maintenance personnel.

3.9.6.8.4.3 A pulsation snubber shall be provided for each of the pressure gages to so reduce pressure pulsations that the gage will not be difficult to read and to reduce the probability of premature gage failure.

3.9.6.8.5 Automatic pressure relief valves designed to open before dangerous pressures are reached shall be installed in the high-pressure liquid pump discharge line, in the product vaporizing and warming heat exchanger lines, and in any other line or component that can be so isolated by closing valves, or otherwise that dangerous pressures might develop.

3.10 LIQUID PRODUCT SERVICING SYSTEM.- A liquid product servicing system shall be provided for each of the two liquid products.

3.10.1 Each liquid product servicing system shall consist of a liquid product delivery line, a liquid servicing line disconnect assembly, and a liquid servicing line.

3.10.2 LIQUID PRODUCT DELIVERY LINES.- Each liquid product delivery line shall be a rigid, well-insulated tube with not less than 1/2 in. inside diameter for transferring liquid product from the liquid product delivery connections to the flexible liquid servicing line disconnect assembly outside the enclosing building.

3.10.2.1 The liquid product delivery lines shall be installed in a manner that will insure against interference with operation and maintenance procedures and the movement of personnel and equipment around the generating and charging plant. Installation where personnel will have to step over the lines in performing normal operation and maintenance procedures or at an overhead height of less than 9 ft in a frequently used area will not be acceptable.

3.10.2.2 CONNECTIONS.- The liquid product delivery lines shall be equipped with the proper fittings for ready and leaktight attachment to or ready removal from their respective liquid product delivery connections and flexible liquid servicing line disconnect assemblies. All fittings shall be so designed and constructed that direct assembly of a liquid oxygen product servicing system component in the liquid nitrogen product servicing system or direct assembly of a liquid nitrogen product servicing system component in the liquid oxygen product servicing system will be impossible.

3.10.2.3 Each liquid product delivery line disconnect fitting shall be equipped with a protective cap or plug that will tightly close and protect the connection when not installed. Each protective cap or plug shall be attached to its fitting by a chain or other device to protect against accidental loss.

3.10.2.4 Each product delivery line shall be insulated in a manner that will insure the minimum practicable evaporation losses during transfer of liquid product from the air processing and separation equipment to the flexible liquid servicing hose disconnect assembly.

3.10.2.4.1 TYPE.- The insulation shall be of a type that will not burn in contact with pure oxygen at atmospheric pressure and normal temperatures, that is dimensionally stable, and that is so applied or of such character that it will not absorb moisture.

3.10.3 DISCONNECT ASSEMBLY.- The servicing line disconnect assemblies shall be designed and constructed for installation outside the enclosing building in positions readily accessible for filling of liquid storage and servicing tanks. Each disconnect assembly shall be fabricated from components with liquid flow passages comparable in size to that of the liquid product delivery line.

3.10.3.1 Each disconnect assembly shall consist of a disconnect coupling for attachment of its liquid servicing line, a manually operated flow control and shutoff valve, a disconnect fitting drain valve, a pressure relief valve, and an inlet connection for attachment to the liquid product delivery line.

3.10.3.2 FLOW CONTROL AND SHUTOFF VALVES.- The flow control and shutoff valves shall be manually operated units designed and constructed for service with liquid oxygen or liquid nitrogen, to provide positive shutoff when closed, and to provide the minimum practicable resistance to flow when open. The valves shall be so constructed that the packing glands and control handles are separated from the valve bodies by sufficient lengths of corrosion-resistant material with low heat conductivity (such as stainless-steel) that the valves will function properly with normal operating procedures.

3.10.3.2.1 The flow control and shutoff valves shall be fabricated from corrosion-resistant material not adversely affected by extended contact with oxygen, nitrogen, moist air, or water.

3.10.3.2.2 The flow control and shutoff valves shall be so mounted that they can be readily opened or closed by personnel standing on the ground outside the enclosing building, and so that force exerted in opening and closing the valves will not be transmitted to the liquid product servicing system piping.

3.10.3.2.3 PACKING.- Valve packing shall be of material safe for use in contact with liquid or gaseous oxygen or nitrogen, and which will effectively seal the valve stem without causing difficulty of operation.

3.10.3.3 SERVICING LINE DISCONNECT COUPLING.- Each servicing line disconnect coupling shall be designed for quick and leaktight attachment or removal of the flexible liquid servicing line. The disconnect couplings shall be so different that direct connection of the oxygen servicing line to the nitrogen disconnect assembly or direct connection of the nitrogen servicing line to the oxygen disconnect assembly will be impossible.

3.10.3.3.1 The servicing line disconnect couplings shall be so mounted to supporting members that force applied in attaching or removing a liquid servicing line or while the servicing line is connected will not be transmitted to the disconnect assembly piping or fittings. Mounting of the disconnect coupling to supporting members shall be accomplished with material possessing considerable resistance to heat flow to reduce to a minimum evaporation of liquid being serviced.

3.10.3.4 DISCONNECT COUPLING DRAIN VALVE.- A manually operated valve for draining liquid from the servicing line and the disconnect coupling shall be provided in the disconnect assembly piping between the disconnect coupling and the flow control and shutoff valve.

3.10.3.5 PRESSURE RELIEF VALVES.- An automatic pressure relief valve shall be provided in the disconnect assembly piping between the disconnect coupling and the flow control and shutoff valve and in the disconnect assembly piping between the flow control and shutoff valve and the disconnect assembly inlet fitting to protect the servicing line, the disconnect assembly, and the liquid product delivery line from excessive pressure.

3.10.3.6 INLET CONNECTION.- Each disconnect assembly inlet connection shall be designed and constructed for ready and leaktight attachment to its liquid product delivery line. The inlet connection shall be so different that attachment of the oxygen disconnect assembly to the nitrogen liquid product delivery line or attachment of the nitrogen disconnect assembly to the oxygen liquid product delivery line will be impossible.

3.10.3.7 DISCONNECT ASSEMBLY MOUNTING PROVISIONS.- Each disconnect assembly shall be equipped with provisions for solidly mounting the entire assembly to the outside surface of the enclosing building on the opposite side from the air compressor air intake filter in a position readily assessible for attachment of the flexible liquid servicing line and operation of the flow control and shutoff valve or the disconnect coupling drain valve. Mounting of the disconnect assembly to the building wall shall be accomplished with material possessing considerable resistance to heat flow to reduce to a minimum evaporation of liquid being serviced.

3.10.3.8 INSULATION.- Each disconnect assembly shall be insulated in a manner that will insure the minimum practicable evaporation losses during transfer of liquid product from the air processing and separation equipment to the receiving container.

3.10.3.8.1 TYPE.- The insulation shall be of a type that will not burn in contact with pure oxygen at atmospheric pressure and normal temperatures, that is dimensionally stable, and that is so applied or of such character that it will not adsorb moisture.

3.10.3.9 Each disconnect assembly attachment fitting shall be equipped with a protective cap or plug that will tightly close and protect the fitting when not in use. The protective cap or plug shall be attached to its fitting by a chain or other device to protect against accidental loss.

3.10.4 LIQUID SERVICING LINES.- A 15-ft long, 3/8-in. internal diameter, flexible, insulated liquid-oxygen transfer hose conforming to Drawing 55C6000 shall be provided for each of the two liquid product servicing systems.

3.10.4.1 CONNECTIONS

3.10.4.1.1 GENERATING AND CHARGING PLANT END.- The generating and charging plant end of each liquid servicing line shall be equipped with a disconnect fitting designed for ready and leaktight attachment to and ready removal from the disconnect coupling on the disconnect assembly with which it is to be used.

3.10.4.1.1.1 Each liquid servicing line generating and charging plant end disconnect fitting shall be provided with a dust cap or plug that tightly closes and protects the fitting when not in use. Each protective cap or plug shall be attached to its disconnect fitting by a chain or other device that will protect against accidental loss.

3.10.4.1.2 SERVICING END

3.10.4.1.2.1 OXYGEN SERVICING LINE.- The servicing end of the oxygen servicing line shall be equipped with a 1-in., female, liquid-oxygen coupling half assembly consisting of a coupling cone, coupling nut, retaining ring, and a plug conforming to Drawings C8987856, C8987857, B8987839, and C8987870, respectively. Assembly of the coupling half components shall be as shown on Drawing C8987831.

3.10.4.1.2.1.1 ADAPTER.- One adapter for attaching the oxygen servicing line to a female, liquid-oxygen tank, medium connector conforming to Drawing 49A3818 shall be furnished with the oxygen servicing line. The adapter shall consist of a 1-in., male, liquid-oxygen coupling half assembly made up from a coupling seat, gasket, and a cap conforming to Drawings C8987855, B8987832, and C8987869, respectively, assembled as shown on Drawing C8987830, and a disconnect assembly made up from a male connector, a coupling nut, and a dust plug conforming to Drawings 49A3820, 49A3819, and 52A3751, respectively. The coupling assemblies shall be joined by securely screwing the external pipe threads of the male connector conforming to Drawing 49A3820 into the internal pipe threads of the coupling seat conforming to Drawing C8987855.

3.10.4.1.2.2 NITROGEN SERVICING LINE.- The servicing end of the nitrogen servicing line shall be equipped with a 1-in., female, liquid-nitrogen coupling half assembly consisting of a coupling cone, coupling nut, retaining ring, and a plug conforming to Drawings C8987877, C8987878, B8987839, and C8987891, respectively. Assembly of the coupling half components shall be as shown on Drawing C8987889.

3.10.4.1.2.2.1 One adapter for attaching the nitrogen servicing line to a female, liquid-oxygen tank, medium connector conforming to Drawing 49A3818 shall be furnished with each liquid nitrogen servicing line. The adapter shall consist of a 1-in., male, liquid-nitrogen coupling half assembly made up from a coupling seat, gasket, and a cap conforming to Drawings C8987876, B8987832, and C8987890, respectively, assembled as shown on Drawing C8987888, and a disconnect assembly made up from a male connector, coupling nut, and a dust plug conforming to Drawings 49A3820, 49A3819, and 52A3751, respectively. The coupling assemblies shall be joined by securely screwing the external pipe threads of the male connector conforming to Drawing 49A3820 into the internal pipe threads of the coupling seat conforming to Drawing C8987876.

3.11 GASEOUS PRODUCT SERVICING SYSTEM.- A gaseous product servicing system shall be provided for each of the two gaseous products.

3.11.1 Each gaseous product servicing system shall consist of a gaseous product delivery line, a charging manifold assembly, and the charging leads, charging hoses, and accessories necessary for filling high-pressure storage containers from the charging manifold.

3.11.2 GASEOUS PRODUCT DELIVERY LINES.- Separate, independent, rigid delivery lines shall be provided for transferring each gaseous product from the air processing and separation equipment to its charging manifold.

3.11.2.1 The gaseous product delivery lines shall be installed in a manner that will insure against interference with operation and maintenance procedures and the movement of personnel and equipment around the generating and charging plant. Installation where personnel will have to step over the lines in performing normal operation and maintenance procedures or at an overhead height of less than 9 ft in a frequently used area will not be acceptable.

3.11.2.2 CONNECTIONS.- The gaseous product delivery lines shall be equipped with the proper fittings for ready and leaktight attachment to or ready removal from their respective gaseous product delivery connections (3.9.6.7) and the charging manifolds. All fittings shall be so designed and constructed that direct assembly of a gaseous oxygen product servicing system component in the gaseous nitrogen product servicing system or direct assembly of a gaseous nitrogen product servicing system component in the gaseous oxygen product servicing system will be impossible.

3.11.2.3 Each gaseous product delivery line disconnect fitting shall be equipped with a protective cap or plug that tightly closes and protects the fitting when not in use. Each protective cap or plug shall be attached to its disconnect fitting by a chain or other device that will protect against accidental loss.

3.11.3 CHARGING MANIFOLD ASSEMBLIES.- Each charging manifold assembly shall be designed and constructed to charge into high-pressure gas storage containers the oxygen or nitrogen vapors received from the air processing and separation equipment through its gaseous product delivery line.

3.11.3.1 Each charging manifold assembly shall consist of a charging manifold, plus the mountings, controls, instruments, and accessories needed for safe and efficient operation of all parts.

3.11.3.2 CHARGING MANIFOLDS.- Each charging manifold shall consist of two independent charging sections, control valves, and cylinder evacuation provisions. The independent charging manifold sections and the control valves shall be designed and constructed for mounting within the enclosing building on an outside wall in a

location readily accessible for carrying empty high-pressure gas storage cylinders to the manifold, charging the cylinders, and removing the charged cylinders from the building.

3.11.3.2.1 MANIFOLD SECTIONS.- Each manifold section shall include seven charging stations. Five of the charging stations shall be installed on the room side of the manifold section at approximately the height of the valve connections on standard 51-in. oxygen or nitrogen gas storage cylinders, and at intervals that will provide space for connecting, disconnecting, and replacing such cylinders standing side-by-side along the manifold section. The other two charging stations shall be installed on the wall side of the manifold section, separated by a horizontal distance of not less than 1 ft, where they will be readily accessible from outside the building through a wall opening for attaching and removing cylinder trailer charging hoses and operating the charging station valves. Each manifold section shall be capable of charging at the full capacity specified in 3.7.1 and 3.7.1.2 when one or more of the charging station valves is open to a receiving container.

3.11.3.2.1.1 CHARGING STATION VALVES.- Each individual charging station shall be equipped with a manually operated shutoff valve designed and constructed for handling 3,500 psi pure oxygen gas or nitrogen gas. Each charging station valve shall be capable of passing the full generating and charging plant charging capacity without excessive pressure drop, and shall positively isolate the attached gas storage container from the manifold section when closed. The valves shall be readily operable by hand, and shall have outlet connections designed for attachment and interchange of the charging leads and charging hoses specified in 3.11.4 and 3.11.5.

3.11.3.2.1.2 Each individual charging station shutoff valve shall be so mounted that excessive force exerted in opening or closing the valve and in attaching or removing charging leads or charging hoses will not be applied to the charging manifold piping or fittings.

3.11.3.2.1.3 Each charging station valve outlet shall be equipped with a protective cap or plug that tightly closes and protects the fitting when not in use. Each protective cap or plug shall be attached to its discornect fitting by a chain or other device that will protect against accidental loss.

3.11.3.2.2 CYLINDER EVACUATION PROVISIONS.- The charging manifold installation shall include a vacuum pumping assembly that can be used with either charging manifold independently or both charging manifolds simultaneously for evacuating the manifold sections and attached high-pressure gas storage containers to an absolute pressure of not to exceed 2 in. Hg. The vacuum pump assembly shall consist of the vacuum pump, an electric drive motor,

installation provisions, and the piping and valving necessary for connecting the vacuum pump to the manifold sections.

3.11.3.2.2.1 EVACUATION CAPACITY.- The vacuum pump assembly shall have a free air pumping capacity of not less than 10 cfm, and shall be constructed for continuous duty in pumping pure oxygen and pure nitrogen at the specified rate from the storage cylinders being evacuated.

3.11.3.2.2.2 VACUUM PUMP DRIVE.- The vacuum pump electric drive motor shall operate from the generating and charging plant electric power supply. The electric drive motor on-off control shall be mounted in a position readily visible and accessible to an operator standing at the charging manifold location within the enclosing building or through a wall opening to an operator standing outside the enclosing building at the cylinder trailer charging hose stations.

3.11.3.2.2.3 VACUUM PUMP ASSEMBLY INSTALLATION.- The vacuum pump assembly shall be so installed with the charging manifolds, that it can be used with any independent charging section alone or simultaneously with any combination of charging sections, by operation of the vacuum shutoff valves, for evacuating high-pressure gas storage containers attached to the charging stations by either the charging lines specified in 3.11.4 or the cylinder trailer charging hoses specified in 3.11.5.

3.11.3.2.2.3.1 SAFETY DEVICE.- The vacuum pump assembly inlet piping shall include a pressure relief device that will insure against damage if a vacuum shutoff valve is opened when the manifold section is pressurized or being used for charging high-pressure cylinders.

3.11.3.2.3 CONTROL VALVES.- Each charging manifold shall be equipped with a master flow control valve for connecting the gaseous product delivery line to either of the two independent charging sections, and the vacuum shutoff valves necessary for evacuating high-pressure gas storage containers through the charging sections.

3.11.3.2.3.1 MASTER FLOW CONTROL VALVE.- Each master flow control valve shall be a manually operated three-ported, two-position valve so installed between the gaseous product delivery line and the two independent manifold sections that it operates to direct all the vapors from the gaseous product delivery line into either manifold section while positively sealing the other manifold section both from the gaseous product delivery line and from the atmosphere.

3.11.3.2.3.1.1 The master flow control valve shall be so mounted that its actuating handle will be readily visible and accessible to an operator standing at the charging manifold within the enclosing building or through the wall opening to an operator standing outside the enclosing building at the cylinder trailer charging hose stations. The master flow control valve mounting shall be such as to insure that excessive force exerted in operating the valve will not be applied to the charging manifold piping or fittings.

3.11.3.2.3.2 VACUUM SHUTOFF VALVES.- The vacuum shutoff valves shall be so installed between the independent manifold sections and the vacuum pump piping that the individual sections, and attached high-pressure gas storage containers, can be evacuated either simultaneously or individually. Each vacuum shutoff valve shall be constructed to impose the least practicable pressure drop when open and the vacuum pump is evacuating the manifold section, shall positively seal the vacuum pump assembly from the manifold section when closed, and shall be readily operable by hand.

3.11.3.2.3.2.1 The vacuum shutoff valves shall be mounted in positions readily visible and accessible to an operator standing at the charging manifold within the enclosing building or through the wall opening to an operator standing outside the enclosing building at the cylinder trailer charging hose stations. Each individual vacuum shutofff valve shall be so mounted that excessive force exerted in opening or closing the valve will not be applied to charging manifold piping or fittings.

3.11.3.2.3.3 FLOW STOP DEVICES.- Check valves or other automatically actuated reverse flow stop devices shall be provided in the vacuum pump assembly piping as necessary to insure against backflow of gases from the vacuum pump assembly piping into the manifold sections. The reverse flow stop devices shall offer the minimum practicable resistance to gas flow from the manifold section to the vacuum pump.

3.11.3.3 CONTROLS AND INSTRUMENTS.- All controls and instruments necessary for safe and effective operation of the charging manifold assembly shall be provided. The controls and instruments furnished shall include the following:

3.11.3.3.1 Two pressure gages conforming to MIL-G-18997 having dial diameters of not less than 4 in. shall be provided for indicating the pressure in each manifold section. The gages shall be graduated in pounds per square inch over approximately 270° of the dial face, and shall be accurate to within 1 percent of full-scale range. The gages shall have safety backs. Vacuum gages shall be provided in the vacuum pump assembly piping where they

will indicate the degree of vacuum existing in the manifold section being evacuated, and where they will be protected from high positive pressures during charging operations.

3.11.3.3.1.1 The manifold section pressure gages shall have a range of approximately 1-1/2 times the normal 3,500-psi working pressure. A range of 0 to 5,000 psi will be satisfactory. The vacuum gages shall have a range of 0 to 30 in. Hg vacuum.

3.11.3.3.1.2 One pressure gage shall be mounted on each manifold section in a position readily visible and accessible to operating personnel standing within the enclosing building in front of the manifold section. A second pressure gage shall be mounted on each manifold section in a position readily visible through the wall opening to an operator standing outside the enclosing building in front of the cylinder trailer charging hose stations. One vacuum gage shall be mounted where it will be readily visible and accessible to operating personnel standing at the charging manifold within the enclosing building. The other vacuum gage shall be mounted where it will be readily visible through the wall opening to an operator standing outside the enclosing building in front of the cylinder trailer charging hose stations.

3.11.3.3.2 Each manifold section shall be provided with a pressure relief device capable of passing the full gas charging output of the generating and charging plant without developing dangerous pressures. The pressure relief devices shall be designed to open at a pressure sufficiently above that at which the automatic pressure relief valves in the high-pressure liquid pump discharge piping operate to prevent opening under normal circumstances, but which will provide protection against damage if the automatic pressure relief valves fail to function. Mounting of the pressure relief devices shall be such that discharge therefrom will not endanger generating and charging plant operating or maintenance personnel.

3.11.3.4 CHARGING MANIFOLD ASSEMBLY MOUNTING.- The charging manifold sections shall be equipped with provisions for being solidly mounted adjacent to each other on the inside surface of an outside wall of the enclosing building, on the opposite side of the building from the air compressor air intake filter. The mounting provisions shall be such as to insure that the charging station valve outlet fittings will be at approximately the height of the cylinder valve outlet fittings on standard 51-in. oxygen gas and nitrogen gas storage cylinders.

3.11.3.5 INLET CONNECTION.- The charging manifold inlet connection shall be designed and constructed for ready and leak-tight attachment to the gaseous product delivery line.

3.11.3.5.1 The charging manifold inlet connection shall be equipped with a protective cap or plug that will tightly close and protect the fitting when not in use. The protective cap or plug shall be attached to the disconnect fitting by a chain or other device that will protect against accidental loss.

3.11.4 CHARGING LEADS.- Ten flexible charging leads designed for connecting oxygen cylinder valves with CGA outlet connection No. 541 to the oxygen charging station shutoff valves specified in 3.11.3.2.1.1 and ten flexible charging leads designed for connecting oil-free nitrogen cylinder valves with CGA outlet connection No. 581 to the $N_2$ charging station shutoff valves shall be provided. (See Pamphlet V-1.)

3.11.4.1 LENGTH.- Each charging lead shall be of sufficient length to permit a horizontal space of not less than 12 in. between a vertical plane through the manifold section charging station valve outlet fittings and the cylinders being charged.

3.11.4.2 The charging leads shall be constructed for handling pure oxygen or nitrogen vapors at pressures up to and including 4,000 psi. The charging leads shall be sufficiently flexible to permit ready connection of the cylinder valves to the charging station valve outlet fittings and to prevent damage from continued flexing in use.

3.11.4.3 CAPACITY.- Each charging lead shall be capable of passing the full generating and charging plant charging capacity without excessive pressure drop.

3.11.4.4 PRESSURE-HANDLING CAPABILITIES

3.11.4.4.1 HYDROSTATIC PRESSURE.- The charging leads shall not leak or show evidence of damage when subjected to an internal water pressure of 8,000 psi for 5 to 10 min.

3.11.4.4.2 GAS PRESSURE.- The charging leads shall not leak or show evidence of damage when subjected to an internal gas pressure of 4,000 psi for 5 to 10 min following the hydrostatic test specified in 3.11.4.4.1.

3.11.4.4.3 BURST PRESSURE.- The charging leads shall not burst when subjected to an internal hydraulic pressure of 16,000 psi.

3.11.4.5 The charging leads shall be so designed and constructed that they can be attached or removed with one open-end or adjustable wrench.

3.11.5 CYLINDER TRAILER CHARGING HOSES.- Two flexible cylinder trailer charging hoses designed for connecting oxygen gas cylinder trailers with CGA charging connection No. 541 to the oxygen charging station shutoff valves and two flexible cylinder trailer charging hoses for connecting nitrogen gas cylinder trailers with CGA charging connection No. 581 to the nitrogen charging station shutoff valves shall be provided.

3.11.5.1 Each charging hose shall be 20 ± 1 ft in length.

3.11.5.2 The hoses shall be constructed for handling pure oxygen or nitrogen vapors at pressures up to and including 4,000 psi. The hoses shall be sufficiently flexible to permit easy handling, to prevent damage from continued coiling and uncoiling, and to permit coiling to a diameter convenient for storage when not in use. The use of plain copper or other metal tubing will not be acceptable.

3.11.5.3 Each hose shall have an inside diameter that will permit charging cylinder trailers at the full capacity specified in 3.7.1 without excessive pressure drop.

3.11.5.4 The charging hose pressure-handling capabilities shall be as specified in 3.11.4.4.

3.11.5.5 The charging hoses shall be so designed and constructed that they can be attached or removed with one common open-end or adjustable wrench.

3.11.5.6 OUTER COVERING.- The outer covering of the charging hoses shall be resistant to abrasion, acids, water, hydrocarbon fuels and oils, greases, alkalis, and heat.

3.11.5.7 Each end of each charging hose shall be provided with a protective cap or plug that will tightly close and protect the fitting when not in use. Each protective cap or plug shall be attached to its disconnect fitting by a chain or other device that will protect against accidental loss.

3.12 ACCESSORIES.- All accessories necessary for safe, dependable, and efficient operation of the generating and charging plant shall be provided. The accessories furnished shall include at least the following:

3.12.1 PRODUCT QUALITY ANALYSIS EQUIPMENT.- All analytical equipment necessary for determining product purities and any feed purities required for proper operation and control of the generating and charging plant shall be provided. All analyzers shall be so constructed and installed that they can be used to analyze samples

from other sources that have impurities in the same range. The purity analysis equipment furnished shall include the following:

a. Automatic continuous indicating oxygen purity analyzer

b. Automatic continuous indicating nitrogen purity analyzer

c. Orsat-type oxygen and nitrogen purity analysis kit

d. Total hydrocarbon content analyzer

e. Methane separation trap for use with hydrocarbon content analyzer

f. Acetylene content test kit.

3.12.1.1 The oxygen and nitrogen continuous indicating purity analyzers shall each include a low purity alarm system that will cause a red light to flash on the air processing and separation equipment control panel whenever the product purity falls below the levels specified in 3.7.1.3 through 3.7.1.3.4.

3.12.2 OPERATION AND MAINTENANCE TOOLS.- When specified (see 6.2), a complete set of all special tools other than common handtools and those tools normally available in motor vehicle repair shops required for proper operation and maintenance of the generating and charging plant components shall be provided.

3.13 INTERCHANGEABILITY.- All parts having the same manufacturer's part number shall be directly and completely interchangeable with each other with respect to installation and performance. Changes in manufacturer's part numbers shall be governed by the drawing number requirements of MIL-D-70327.

3.14 FINISHES AND PROTECTIVE COATINGS

3.14.1 SURFACES CONTACTING OXYGEN.- All surfaces, parts, fittings, et cetera, of the generating and charging plant that will be in contact with high-purity oxygen shall be thoroughly cleaned with a nonflammable solvent such as trichlorethylene or other cleaning agents specifically approved by the procuring activity, to remove all metal shavings, oil, grease, and other foreign material. No other cleaning, priming, or painting with organic materials shall be performed on these surfaces.

3.14.2 EXPOSED PARTS AND SURFACES.- All exposed parts and surfaces of the generating and charging plant except parts and surfaces that contact high-purity oxygen and certain corrosion-resistant materials shall be treated as specified herein.

3.14.2.1 CORROSION-RESISTANT METAL PARTS AND SURFACES.- Metal parts and surfaces of the generating and charging plant that are fabricated from corrosion-resistant materials need not be given protective coatings if such coatings will interfere with their proper functioning.

3.14.2.2 RUBBER PRODUCTS.- Power transmission drive belts, electric cables, and other similar soft-rubber components shall not be painted.

3.14.3 CHEMICAL TREATMENT AND PRIMING OF SURFACES NOT SUBJECT TO HIGH OPERATING TEMPERATURES

3.14.3.1 FERROUS MATERIALS.- Ferrous parts and surfaces not zinc coated shall be cleaned and chemically treated in accordance with MIL-C-490, grade I; grade II, types 1, 4, or 5; or grade III. A primer coat conforming to TT-P-636 or MIL-P-26915 shall then be applied.

3.14.3.1.1 All bolts, screws, nuts, washers, et cetera, shall be cadmium plated in accordance with QQ-P-416, given a phosphate protective coating conforming to MIL-P-16232, or zinc plated in accordance with QQ-Z-325. Cadmium plating shall be type II or III, as applicable.

3.14.3.2 ALUMINUM MATERIALS.- Aluminum and aluminum-alloy parts and surfaces shall be cleaned in accordance with MIL-S-5002. A corrosion-preventive chemical film conforming to MIL-C-5541, followed by a primer coat conforming to MIL-P-8585 shall then be applied. An anodic film conforming to MIL-A-8625 may be used in lieu of the chemical film in accordance with MIL-C-5541.

3.14.3.3 MAGNESIUM MATERIALS.- Magnesium-base alloy parts and surfaces shall be cleaned and chemically treated in accordance with MIL-M-3171. Two primer coats conforming to MIL-P-8585 shall then be applied.

3.14.3.4 WOODEN MATERIALS.- Wooden parts and surfaces shall be treated with sealer conforming to MIL-S-13518.

3.14.3.5 OTHER SURFACES.- Other types of surfaces shall be cleaned and chemically treated in accordance with MIL-T-704. A primer coat conforming to MIL-P-8585 shall then be applied.

3.14.4 CHEMICAL TREATMENT OF SURFACES SUBJECT TO HIGH OPERATING TEMPERATURES.- Surfaces subject to high temperatures in operation or use shall be cleaned, but not primed, in accordance with 3.14.3.1 through 3.14.3.5.

3.14.5 FINISH COATS

3.14.5.1 PARTS NOT SUBJECT TO HIGH TEMPERATURES.- All exposed components and surfaces of the generating and charging plant except those parts subject to high operating temperatures shall be finished with two coats of aircraft gray gloss enamel, color 512, conforming to MIL-E-7729.

3.14.5.2 PARTS SUBJECT TO HIGH TEMPERATURES.- All exposed components and surfaces of the generating and charging plant that are subject to high temperatures during normal operation and use shall be finished with two coats of paint conforming to MIL-P-20087. Each coating shall be permitted to dry for not less than 24 hrs before either applying a second coat or exposure to high temperatures.

3.15 MARKING

3.15.1 PIPELINE MARKING.- Exposed pipelines of the generating and charging plant shall be marked for identification in accordance with MIL-STD-101.

3.15.2 Lubricant level sight glasses shall be plainly marked to show the lubricant level recommended for operation of the equipment at full capacity.

3.15.3 REMOVABLE PANELS.- Each removable panel shall be marked on its inner surface with the information necessary to identify its proper location and position.

3.15.4 PRODUCT IDENTIFICATION.- A positive means for quick identification of the product being dispensed through the servicing line disconnect assemblies and through the liquid servicing lines shall be provided in a conspicuous location on each servicing line disconnect assembly and on each liquid servicing line so that no doubt can exist as to which product is being discharged into the receiving container.

3.15.5 COLOR IDENTIFICATION SYSTEM

3.15.5.1 OXYGEN SERVICING LINES.- The oxygen servicing lines shall have 1-in. wide permanently affixed green bands spaced 6 in. apart over a length of not less than 3 ft on each end. Each end shall also be marked with a permanently attached green band on which OXYGEN is permanently imprinted in white block letters not less than 1/2 in. high.

3.15.5.2 NITROGEN SERVICING LINES.- The nitrogen servicing lines shall have 1-in. wide permanently affixed red bands spaced 6 in. apart over a length of not less than 3 ft on each end. Each end shall also be marked with a permanently attached red band on which NITROGEN is permanently imprinted with white block letters not less than 1/2 in. high.

3.15.6 CONTROL MARKING.- Unless location makes such identification impractical, all valves, gages, controls, and indicators used in normal operation and control of the generating and charging plant shall be identified by securely attached nameplates of such composition that exposure to oil, dirt, water, light, heat, cleaning fluids, et cetera, will not fade them or cause them to become eradicated or distorted. Securely attached metal tags may be used to identify valves and other controls not normally used for operation and control of the equipment, or which are so located that the application of nameplates would be impractical.

3.15.7 OPERATING AND PRECAUTIONARY INSTRUCTIONS.- Brief and easily readable operating and precautionary instructions shall be permanently affixed on or near the generating and charging plant air processing and separation equipment control panel in a readily accessible and protected location. The instructions shall be clear, concise, and sufficient to enable operation of the generating and charging plant without damage to the equipment or injury to personnel. Instruction panels shall be made from sheet aluminum or sheet zinc of not less than 0.050 in. thickness, anodized, or etched to produce raised markings with a black or other dark color background, and with a raised border of not less than 1/4 in. width.

3.15.8 FLOW DIAGRAM.- A flow diagram illustrating the generating and charging plant overall processes and equipment shall be permanently affixed on or near the air processing and separation equipment control panel in a readily accessible and protected location. The flow diagram shall be of sufficient size for clear readability, and shall be made from sheet aluminum or sheet zinc as specified in 3.15.7.

3.15.9 ELECTRICAL WIRING DIAGRAM.- A complete electrical wiring diagram detailing the generating and charging plant electrical systems shall be permanently affixed on or near the air processing and separation equipment control panel in a readily accessible and protected location. The wiring diagram shall be made from sheet aluminum or sheet zinc as specified in 3.15.7.

3.15.9.1 VOLTAGE CONVERSION INSTRUCTIONS.- Complete and readily understandable directions for converting from one supply voltage to the other shall be either incorporated into the electrical wiring diagram or shown on a separate instruction plate adjacent to it. The voltage conversion instruction plate shall be prepared in the same manner as the electrical wiring diagram.

3.15.10 TRANSPORTATION DATA PLATE.- A transportation data plate in accordance with MIL-P-514 shall be securely attached to the outside of each shipping section in a location that will be readily visible and accessible when the shipping package is prepared for shipment. The transportation data plate shall include the following information:

TRANSPORTATION DATA PLATE

| | |
|---|---|
| Shipping weight | Overall width |
| Shipping cubage | Overall height |
| Overall length | C. G. Location |

T.O. or T.M. Number

3.15.10.1 LIFTING INSTRUCTION PLATE.- An instruction plate containing all information necessary for transportation personnel to rig a safe lifting sling from common cable and spreader bar components and to safely lift the shipping section with a 3-g acceleration shall be securely attached to the outside of the shipping section near the transportation data plate and in a location that will be readily visible and accessible when the shipping section is prepared for shipment. The lifting instruction plate shall be of the same material and prepared in the same manner as the transportation data plate.

3.15.11 LUBRICATION POINTS.- Each lubrication point shall be identified by a filled-in circle of approximately 2-in. diameter around the lubrication point. The circle shall be painted on the equipment with red gloss enamel, color 509, conforming to MIL-E-7729. Lubricant filler caps shall be painted with the same enamel.

3.15.11.1 LUBRICATION WARNING PLATES.- Where the use of high-pressure lubrication equipment will cause damage to grease seals or other parts, a warning plate shall be affixed to the equipment in a conspicuous location.

3.16 IDENTIFICATION OF PRODUCT.- Equipment, assemblies, and parts shall be marked for identification in accordance with MIL-STD-130.

3.17 WORKMANSHIP.- All generating and charging plant parts and accessories shall be fabricated and finished in a thoroughly workmanlike manner. Particular attention shall be given to freedom from blemishes, defects, burrs, and sharp edges; accuracy of dimensions, radii of fillets, and marking of parts and assemblies; thoroughness of welding, brazing, soldering, painting, wiring, and riveting; alignment of parts and tightness of assembly screws and bolts; cleaning, et cetera.

3.17.1 CLEANING.- Components of the generating and charging plant shall be thoroughly cleaned to remove dirt; excess soldering, brazing, and welding flux; welding slag; loose, spattered, or excess solder; metal chips; and other foreign materials before, during, and after assembly.

4. QUALITY ASSURANCE PROVISIONS

4.1 Unless otherwise specified herein, the supplier is responsible for the performance of all inspection requirements prior to submission for Government inspection and acceptance. Except as otherwise specified, the supplier may use his own facilities or any commercial laboratory acceptable to the Government. Inspection records of the examinations and tests shall be kept complete and available to the Government as specified in the contract or order.

4.2 CLASSIFICATION OF TESTS.- Inspection and testing of the generating and charging plant shall be classified as follows:

a. Acceptance tests . . . . . See 4.3

b. Preproduction testing . . . . . See 4.6

4.3 ACCEPTANCE TESTS.- The acceptance tests shall consist of the individual tests.

4.3.1 INDIVIDUAL TESTS.- Each generating and charging plant shall be subjected to the following tests as described under 4.5:

a. Examination of product . . . . . See 4.5.1

b. Mechanical inspection . . . . . See 4.5.2

c. Functional check . . . . . See 4.5.3

d. Pressure test . . . . . See 4.5.5 through 4.5.5.1.3

e. Individual acceptance test . . See 4.5.7

4.4 TEST CONDITIONS

4.4.1 APPARATUS.- Insofar as practicable, apparatus used in conjunction with the testing specified herein shall be of laboratory precision type and shall be calibrated at intervals spaced to insure continued accuracy.

4.4.2 TOOLS.- Special tools and field equipment shall be used to the maximum practicable extent during testing. Utilization of these tools and the field equipment shall be sufficient to determine their usefulness. Instances where the special tools furnished are inadequate shall be recorded in detail.

4.4.3 INSTRUMENTATION

4.4.3.1 PRESSURES.- Pressures and pressure differentials shall be measured by means of the pressure gages and differential pressure meters furnished as part of the generating and charging plant. Barometric pressures shall be measured by means of a properly calibrated mercurial or aneroid barometer.

4.4.3.1.1 Pressures in excess of atmospheric pressure shall be recorded in pounds per square inch gage. Pressures up to atmospheric pressure, including barometric pressure, shall be recorded in either millimeters of mercury or inches of mercury absolute. Differential pressures shall be recorded in inches of water or inches of mercury, as applicable.

4.4.3.2 TEMPERATURES.- Temperatures shall be measured by means of appropriately located thermometers, by thermocouples used with calibrated potentiometers, or by resistance bulbs, as applicable. Whenever practicable, the temperature indicating instruments furnished as part of the generating and charging plant itself shall be used.

4.4.3.2.1 Temperatures shall be recorded in degrees Fahrenheit.

4.4.3.3 ROTATIONAL SPEEDS.- Rotational speeds shall be determined by a directly coupled revolution counter, by a directly coupled tachometer, or by a strobotachometer. Whenever practicable, the rotational speed indicating instruments furnished as part of the generating and charging plant itself shall be used.

4.4.3.3.1 Rotational speeds shall be recorded in revolutions per minute.

4.4.4 PRODUCTION RATE DETERMINATION

4.4.4.1 LIQUID PRODUCT.- Liquid oxygen and liquid nitrogen production rates shall be determined by weighing the liquid delivered into a container maintained at atmospheric pressure and through the generating and charging plant liquid servicing lines specified in 3.10.4. Throughout a production capacity measurement period, the column liquid levels and generating and charging plant pressures shall be maintained within the limits recommended by the manufacturer.

4.4.4.1.1 COLLECTION CONTAINER CALIBRATION.- Containers for collection and weighing of liquid product shall be calibrated for heat leak evaporation losses. The weight of liquid found to evaporate from the container in a length of time equal to the production collection period may be added to the weight collected to determine the true product delivery capacity. Heat leak evaporation loss rate tests shall be made only when the container is not less than half full, and when the filled container has set for not less than 12 hrs after filling to permit stabilization of temperatures in the container and its insulation. Allowance shall not be permitted for liquid evaporated in the liquid product servicing systems since they are part of the generating and charging plant.

4.4.4.1.2 Liquid delivery rates shall be recorded in pounds per hour of the liquid actually delivered into the weighing container.

4.4.4.2 GASEOUS PRODUCT.- Gaseous oxygen and gaseous nitrogen production rates shall be determined by the increase of pressure in high-pressure gas storage containers being charged to not less than 3,500 psi or by passing the vapors through the charging manifold assemblies specified in 3.11.3 at not less than 3,500 psi, expanding the vapors to gas meter inlet pressure after the charging manifold, and measuring the gas volume with a properly calibrated recording- or totaling-type gas flowmeter designed to handle the product. Throughout a production capacity measurement period, the column liquid levels and generating and charging plant pressures shall be maintained within the limits recommended by the manufacturer.

4.4.4.2.1 Gaseous product delivery rates shall be recorded both as the number of pounds per hour and as the number of standard (760 mm Hg and 70°F) cubic feet per hour charged through the manifold assembly.

4.4.5 LUBRICANTS

4.4.5.1 AIR COMPRESSOR

4.4.5.1.1 CRANKCASE OIL.- The air compressor crankcase lubricating oil used for the testing specified herein shall conform to MIL-L-2104 or MIL-L-26087. The viscosity grade shall be as recommended by the air compressor manufacturer.

4.4.5.1.2 UPPER CYLINDER OIL.- The air compressor upper cylinder lubricating fluid used for the testing specified herein shall be of the type and viscosity grade specified by the air compressor manufacturer.

4.4.5.2 MISCELLANEOUS LUBRICANTS.- Other lubricants required for the testing specified herein shall be in accordance with applicable military specifications and of the type and grade recommended by the manufacturer.

4.4.5.3 LUBRICATING OIL CONSUMPTION.- Lubricating oil consumption rates shall be determined by measuring the quantity that must be added to maintain a given level in the oil reservoir.

4.4.5.3.1 Lubricating oil consumption shall be recorded as the number of quarts consumed per 24-hr day or the number of quarts consumed per hour, whichever provides more convenient units.

4.4.6 ELECTRIC POWER CONSUMPTION.- Electric power consumption shall be determined by measuring the total power used with a totaling or recording polyphase watt-hour meter or computing the power consumed from data obtained by using recording ammeters, voltmeters, and power factor meters on the individual phases.

4.4.6.1 Electric power consumption shall be recorded as the number of kilowatt hours of electrical energy used during each period of production capacity measurement. When production capacity is measured for a 1-hr period, the total number of kilowatt hours of electrical energy used during that period shall be recorded.

4.4.7 INSPECTIONS, SERVICINGS, AND ADJUSTMENTS.- Inspections, servicings, and adjustments shall be performed as specified by the generating and charging plant operating and maintenance instruction handbook unless such instructions are contrary to those necessary for complying with the requirements specified herein. Throughout the endurance testing, these inspections, servicings, and adjustments shall be performed during the shutdown periods allowed by 4.5.6.2.

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4.4.8 OBSERVATIONS.- During the progress of all tests, such characteristics as smoothness of operation, vibrations, ease of control, speed regulation, pressure regulation, freedom from leaks, and the operation of auxiliary equipment shall be observed to determine whether the generating and charging plant complies with all requirements specified herein.

4.4.9 PREPARATION FOR TEST.- The generating and charging plant shall be prepared for test by assembly, adjustment, and servicing as specified in the operating and maintenance instruction handbook.

4.4.10 TEST DATA

4.4.10.1 CORRECTION OF DATA.- If the testing specified herein cannot be conducted under the stated conditions, the tests may, upon approval by the procuring activity, be conducted under other conditions and the performance under the specified conditions calculated from the test results obtained. The manner of calculation shall be demonstrated, and actual test data proving the correctness of the calculation methods used shall be presented for review by the procuring activity.

4.4.10.2 OPERATIONAL DATA.- Operational data shall be recorded at intervals not to exceed 1 hr. Data recorded shall include the following:

a. Air compression equipment

(1) Discharge pressure for each stage (psig)

(2) Lubricating oil pressure (psig)

(3) Lubricating oil temperature into cooler (° F)

(4) Lubricating oil temperature from cooler (° F)

(5) Coolant temperature from radiator (° F)

(6) Coolant temperature into radiator (° F)

(7) Air inlet temperature to each stage (° F)

(8) Discharge air temperature from each stage (° F)

(9) Process air temperature from aftercooler (° F)

(10) Pressure drop across inlet air filter (In $H_2O$)

(11) Upper cylinder oil feed rate for each cylinder with such lubrication (drops per minute)

b. Air separation equipment

(1) General

(a) Process air supply pressure (psig)

(b) Process air supply temperature (° F)

(c) Process air supply rate (pph)

(2) Rectification equipment

(a) Rectifying column liquid levels (inches)

(b) Rectifying column pressures (psig)

(c) Air pressure to heat exchangers (psig)

(d) Air pressure from heat exchangers (psig)

(e) Air pressure to expansion valves (psig)

(f) Control settings

(g) Product purities (percent)

(h) All other instrument readings and control settings used in controlling the generating and charging plant and determining its operational characteristics.

(3) Refrigeration equipment

All pressures, temperatures, flow rates, instrument readings, and control settings used in controlling the generating and charging plant and determining its operational characteristics.

(4) Expansion engines (if used)

(a) Expansion engine speed (rpm)

(b) Lubricating oil pressures

(c) Inlet air pressure (psig)

(d) Interstage pressures (if applicable) (psig)

(e) Discharge pressure (psig)

(f) Inlet gas temperature (° F)

(g) Discharge gas temperature (° F)

(h) All other instrument readings and control settings used in controlling the expansion engines and determining their operational characteristics.

(5) Air purification and product purification equipment

All pressures, temperatures, flow rates, instrument readings, and control settings used in controlling the generating and charging plant and determining its operational characteristics.

4.4.10.3 PRODUCTION DATA.- Production data (average rate at which liquid or gaseous product was produced during the immediately preceding 2 hrs) shall be recorded at the completion of each 2 hrs of production.

4.4.10.4 PSYCHROMETRIC DATA.- Wet- and dry-bulb temperature readings shall be recorded at intervals not to exceed 4 hrs during operation.

4.4.10.5 BAROMETRIC PRESSURE.- The barometric pressure shall be recorded at intervals not to exceed 4 hrs during operation.

4.4.10.6 LUBRICATING FLUID CONSUMPTION.- The average lubricating fluid consumption rates for each 24 hr or shorter period of operation shall be recorded at the end of the period.

4.4.10.7 TOLERANCES

4.4.10.7.1 Data on weights and liquid flow rates shall be accurate to within 1 percent.

4.4.10.7.2 Data on gas and vapor flow rates shall be accurate to within 2 percent.

4.4.10.7.3 Data on dry-bulb and wet-bulb temperatures for psychrometric determinations shall be accurate to within 1° F.

4.4.10.7.4 Barometric pressure readings shall be accurate to within 0.1 mm Hg.

4.4.10.7.5 Data on rotational speeds shall be accurate to within 2 percent.

4.4.10.7.6 Data on product purities shall be accurate to within 0.1 percent.

4.4.10.8 PRESSURE TEST RECORD.- The pressures at which each generating and charging plant component is tested and the length of time during which it is subjected to the pressures shall be recorded.

4.5 TEST METHODS

4.5.1 EXAMINATION OF PRODUCT.- The overall generating and charging plant and its individual component parts shall be examined for compliance with the requirements specified herein. The examination shall include inspection of materials, workmanship, dimensions, markings, et cetera.

4.5.2 MECHANICAL INSPECTION.- A mechanical inspection of all components and parts of the generating and charging plant for defects and damage shall be conducted. All pertinent data concerning condition, defects of manufacture, damage in transit, and damage through use prior to test shall be recorded.

4.5.3 FUNCTIONAL CHECK.- All mechanical parts of the generating and charging plant shall be checked for functioning and shall operate freely and function properly.

4.5.4 DIMENSIONS AND WEIGHT.- The overall dimensions and total weights of each individual shipping section when prepared for shipment shall be determined and recorded.

4.5.5 PRESSURE TEST.- Each component and circuit of the generating and charging plant that operates under positive pressure in normal service shall be pressure tested in accordance with the ASME Unfired Pressure Vessel Code. Automatic pressure relief valves and blowout-type safety heads need not be installed for this testing. Distortion, damage, or leaks resulting from the pressure testing shall be cause for rejection of the components affected.

4.5.5.1 CHARGING LEAD AND CHARGING HOSE PRESSURE TESTS

4.5.5.1.1 HYDRAULIC PRESSURE TEST.- Each charging lead specified in 3.11.4 and each cylinder trailer charging hose specified in 3.11.5 shall be subjected to an internal water pressure of 8,000 psi for 5 to 10 min. Each item shall be observed and examined for leakage or evidence of damage during and after the test. Leakage or damage detected as a result of the test shall be cause for rejection.

4.5.5.1.2 GAS PRESSURE TEST.- After subjection to the test specified in 4.5.5.1.1, each charging lead and each charging hose shall be subjected to an internal gas pressure of not less than 4,000 psi for 5 to 10 min. Each item shall be observed for leakage by submersion in a water bath throughout the test, and examined for damage after the test. Leakage or damage detected as a result of the test shall be cause for rejection.

4.5.5.1.3 BURST PRESSURE TEST.- One charging lead from each lot of 50 or less and one charging hose from each lot of 20 or less shall be selected at random and subjected to a sufficient internal hydraulic pressure to cause failure. If the item fails below 16,000 psi, it shall be considered to be unsatisfactory and five more samples from same lot shall be tested in the same manner. If any of the five additional samples fail below 16,000 psi, the entire lot shall be rejected.

4.5.6 PERFORMANCE DEMONSTRATION AND ENDURANCE TEST.- The generating and charging plant shall be subjected to a combination performance demonstration and endurance test consisting of a continuous production period conducted as follows:

4.5.6.1 PREPARATION FOR TEST.- The generating and charging plant shall be erected and installed as directed by the procuring activity and run-in as the manufacturer determines necessary for his preliminary checkout operation. All necessary adjustments other than normal control adjustments shall be made during the run-in and shall remain undisturbed thereafter. Following the running-in, the generating and charging plant shall be thawed and serviced for normal operation as specified in the operation and maintenance instruction handbook.

4.5.6.2 OPERATING CONDITIONS.- Operation throughout the performance demonstration and endurance test period shall be as continuous as possible, except that the generating and charging plant may be shut down for no longer than 1 hr out of each 24 hrs (1 hr each calendar day) if necessary for lubrication, minor adjustments and repairs, inspections, and preventive maintenance without penalty. Thaw of an individual generating and charging plant component, such as an individual heat exchanger section, at 10-day intervals (a maximum of three individual component thaws throughout the performance demonstration and endurance test period) will be permitted if such individual component thaw procedure does not reduce average production below the rates specified in 3.7.1 and 3.7.1.2. The operation time required to achieve the production rate specified in 3.7.1 at the beginning of the test shall not exceed the limit specified in 4.5.6.3.1. The operation time required to resume the production rates specified in 3.7.1 or 3.7.1.2 after each shutdown shall not exceed 1 hr or a length of time equal to the shutdown period, whichever is less. The length of operation time required to achieve rated production at the beginning of the test, the length of operation time required to resume rated production after each shutdown, the length of each shutdown, the reason for each shutdown, corrective actions taken, and all difficulties and malfunctions encountered shall be individually recorded on the test data sheets.

4.5.6.2.1 If an interruption of greater length than that allowed in 4.5.6.2 (totaling more than 1 hr in a 24-hr period) is necessary and results in a production break of 12 hrs or less, the required production time shall be extended by 2 hrs for each hour of shutdown time plus the operation time necessary for resuming the production rates specified in 3.7.1 and 3.7.1.2. Example: a 5-hr shutdown requiring an additional 3 hrs of operation to resume rated production would extend the test period by 13 hrs of actual production time in addition to that specified herein. In case of necessity for a shutdown in excess of the permissible 1 hr, this 1 hr shall not be omitted from the shutdown time total when computing the specified extension or required production time. If a production break of more than 12 hrs is necessary, the purpose of the test shall be considered defeated and the test shall be repeated unless continuation is authorized by the procuring activity.

4.5.6.2.2 Production periods of less than 12 hrs duration between production breaks shall not be credited to performance demonstration and endurance test time.

4.5.6.2.3 Operation throughout the performance demonstration and endurance test shall be under conditions as close to the design criteria specified in 3.7.1 as possible consistent with the installation and erection requirements imposed by the procuring activity.

4.5.6.2.4 Throughout the specified performance demonstration and endurance testing specified herein, the generating and charging plant shall deliver liquid product through the liquid servicing lines specified in 3.10.4 into storage containers maintained at atmospheric pressure, as specified in 4.4.4.1. Gaseous product shall be delivered through the charging manifold assemblies specified in 3.11.3 into high-pressure gas storage containers or through gas meters as specified in 4.4.4.2.

4.5.6.3 TEST PROCEDURES

4.5.6.3.1 CONCURRENT LIQUID OXYGEN AND GASEOUS NITROGEN PRODUCTION.- When all components within the enclosing building are initially at or above the temperature specified in 3.7.1, the generating and charging plant shall be adjusted for simultaneous liquid oxygen and gaseous nitrogen production, started, and operated in accordance with 4.5.6.2 through 4.5.6.2.4 until the rates at which it will continuously and concurrently produce liquid oxygen of the specified quality and gaseous nitrogen of the specified quality have been established for each of the following ratios:

| Ratio | Percent of Maximum Liquid Oxygen Production | Percent of Maximum Gaseous Nitrogen Production |
|---|---|---|
| a. | 80 to 90 | 20 to 10 |
| b. | 45 to 55 | 55 to 45 |
| c. | 10 to 20 | 90 to 80 |

4.5.6.3.1.1 The length of operation time after starting of the air compressor necessary to bring the generating and charging plant into production at the rate required by 3.7.1.2, the maximum liquid oxygen and gaseous nitrogen production rates achieved for each of the specified ratios, the average liquid oxygen and gaseous nitrogen production rates for each of the specified ratios, and the average power consumption shall be individually determined and recorded for the test. The operation time required after starting of the air compressor to bring the generating and charging plant into production at the rate required by 3.7.1.2 shall not exceed 5 hrs, and the average production rate (based on the daily averages) for each of the specified ratios shall be not less than that required by 3.7.1.2. Liquid oxygen and gaseous nitrogen production shall be continued at maximum rate for not less than 24 hrs at each of the specified ratios after reaching rated production capacity for that ratio. Operation time during which product is not being delivered at an average rate equal to or above the production rate required by 3.7.1.2 shall not be credited toward completion of the required production time. 7r

4.5.6.3.2 LIQUID OXYGEN PRODUCTION.- Upon completion of the concurrent liquid oxygen and gaseous nitrogen production test and without stopping or discontinuing operation, the generating and charging plant shall be changed over to produce liquid oxygen alone, and operated in accordance with 4.5.6.2 through 4.5.6.2.4 until the rate at which it will continuously produce liquid oxygen of the specified quality has been extablished. The time required to make the change-over from concurrent liquid oxygen and gaseous nitrogen to liquid oxygen production alone, the length of operation time necessary to bring the generating and charging plant into production at the rate required by 3.7.1, the maximum production rate achieved, the average production rate, and the average power consumption shall be individually determined and recorded for the test. The average production rate (based on the daily averages) shall be not less than 125 pph, and the generating and charging plant shall deliver an average of not less than 1.0 lbs of liquid oxygen per kilowatt-hour of electric energy consumed. Liquid oxygen production shall be continued at maximum rate for not less than 72 hrs after reaching rated production capacity. Operation time during which product is not being delivered at an average rate equal to or above the production rate required by 3.7.1 shall not be credited toward completion of the required production time. 7r

4.5.6.3.3 CONCURRENT LIQUID OXYGEN AND GASEOUS OXYGEN PRODUCTION.- Upon completion of the liquid oxygen production test and without stopping or discontinuing operation, the generating and charging plant shall be changed over to produce liquid oxygen and gaseous oxygen simultaneously, and operated in accordance with 4.5.6.2 through 4.5.6.2.4 until the rates at which it will continuously and concurrently produce liquid oxygen of the specified quality and gaseous oxygen of the specified quality have been established for each of the ratios

required by 4.5.6.3.1. The time required to make the changeover from liquid oxygen to concurrent liquid oxygen and gaseous oxygen production, the length of operation time necessary to bring the generating and charging plant into production at the rate required by 3.7.1.2 for each of the specified ratios, the maximum liquid oxygen and gaseous oxygen production rates achieved for each of the specified ratios, the average liquid oxygen and gaseous oxygen production rates for each of the specified ratios, and the average power consumption shall be individually determined and recorded for the test. The average production rate (based on the daily averages) for each of the specified ratios shall be not less than that required by 3.7.1.2. Liquid oxygen and gaseous oxygen production shall be continued at maximum rate for not less than 24 hrs at each of the specified ratios after reaching rated production capacity for that ratio. Operation time during which product is not being delivered at an average rated equal to or above the production rate required by 3.7.1.2 shall not be credited toward completion of the required production time.

4.5.6.3.4 GASEOUS OXYGEN PRODUCTION.- Upon completion of the concurrent liquid oxygen and gaseous oxygen production test and without stopping or discontinuing operation, the generating and charging plant shall be changed over to produce gaseous oxygen alone, and operated in accordance with 4.5.6.2 through 4.5.6.2.4 until the rate at which it will continuously produce gaseous oxygen of the specified quality has been established. The time required to make the changeover from concurrent liquid oxygen and gaseous oxygen to gaseous oxygen production alone, the length of operation time necessary to bring the generating and charging plant into production at the rate required by 3.7.1, the maximum production rate achieved, the average production rate, and the average power consumption shall be individually determined and recorded for the test. The average production rate (based on the daily averages) shall be not less than 1,600 standard cubic feet per hour. Gaseous oxygen production shall be continued at maximum rate for not less than 72 hrs after reaching rated production capacity. Operation time during which product is not being delivered at an average rate equal to or above the production rate required by 3.7.1 shall not be credited toward completion of the required production time.

4.5.6.3.5 CONCURRENT GASEOUS OXYGEN AND GASEOUS NITROGEN PRODUCTION.- Upon completion of the gaseous oxygen production test and without stopping or discontinuing operation, the generating and charging plant shall be changed over to produce gaseous oxygen and gaseous nitrogen simultaneously, and operated in accordance with 4.5.6.2 through 4.5.6.2.4 until the rates at which it will continuously and concurrently produce gaseous oxygen of the specified quality and gaseous nitrogen of the specified quality have been established for each of the ratios required by 4.5.6.3.1. The time required to make the changeover from gaseous oxygen to concurrent gaseous oxygen and gaseous nitrogen production, the length of operation time necessary to bring the

generating and charging plant into production at the rate required by 3.7.1.2 for each of the specified ratios, the maximum gaseous oxygen and gaseous nitrogen production rates achieved for each of the specified ratios, the average gaseous oxygen and gaseous nitrogen production rates for each of the specified ratios, and the average power consumption shall be individually determined and recorded for the test. The average production rate (based on the daily averages) for each of the specified ratios shall be not less than that required by 3.7.1.2. Gaseous oxygen and gaseous nitrogen production shall be continued at maximum rate for not less than 24 hrs at each of the specified ratios after reaching rated production capacity for that ratio. Operation time during which product is not being delivered at an average rate equal to or above the production rate required by 3.7.1.2 shall not be credited toward completion of the required production time.

4.5.6.3.6 GASEOUS NITROGEN PRODUCTION.- Upon completion of the concurrent gaseous oxygen and gaseous nitrogen production test and without stopping or discontinuing operation, the generating and charging plant shall be changed over to produce gaseous nitrogen alone, and operated in accordance with 4.5.6.2 through 4.5.6.2.4 until the rate at which it will continuously produce gaseous nitrogen of the specified quality has been established. The time required to make the changeover from concurrent gaseous oxygen and gaseous nitrogen production to gaseous production alone, the length of operation time necessary to bring the generating and charging plant into production at the rate required by 3.7.1, the maximum production rate achieved, the average production rate, and the average power consumption shall be individually determined and recorded for the test. The average production rate (based on the daily averages) shall be not less than 1,150 standard cubic feet per hour. Gaseous nitrogen production shall be continued at maximum rate for not less than 72 hrs after reaching rated production capacity. Operation time during which product is not being delivered at an average rate equal to or above the production rate required by 3.7.1 shall not be credited toward completion of the required production time.

4.5.6.3.7 CONCURRENT GASEOUS NITROGEN AND LIQUID NITROGEN PRODUCTION.- Upon completion of the gaseous nitrogen production test and without stopping or discontinuing operation, the generating and charging plant shall be changed over to produce gaseous nitrogen and liquid nitrogen simultaneously, and operated in accordance with 4.5.6.2 through 4.5.6.2.4 until the rates at which it will continuously and concurrently produce gaseous nitrogen of the specified quality and liquid nitrogen of the specified quality have been established for the changeover from gaseous nitrogen to concurrent gaseous nitrogen and liquid nitrogen production, the length of operation time necessary to bring the generating and charging plant into production at the rate

required by 3.7.1.2 for each of the specified ratios, the maximum gaseous nitrogen and liquid nitrogen production rates achieved for each of the specified ratios, the average gaseous nitrogen and liquid nitrogen production rates for each of the specified ratios, and the average power consumption shall be individually determined and recorded for the test. The average production rate (based on the daily averages) for each of the specified ratios shall be not less than that required by 3.7.1.2. Gaseous nitrogen and liquid nitrogen production shall be continued at maximum rate for not less than 24 hrs at each of the specified ratios after reaching rated production capacity for that ratio. Operation time during which product is not being delivered at an average rate equal to or above the production rate required by 3.7.1.2 shall be credited toward completion of the required production time.

4.5.6.3.8 LIQUID NITROGEN PRODUCTION.- Upon completion of the concurrent gaseous nitrogen and liquid nitrogen production test and without stopping or discontinuing operation, the generating and charging plant shall be changed over to produce liquid nitrogen alone, and operated in accordance with 4.5.6.2 through 4.5.6.2.4 until the rate at which it will continuously produce liquid nitrogen of the specified quality has been established. The time required to make the changeover from concurrent gaseous nitrogen and liquid nitrogen production to liquid nitrogen production alone, the length of operation time necessary to bring the generating and charging plant into production at the rate required by 3.7.1, the maximum production rate achieved, the average production rate, and the average power consumption shall be individually determined and recorded for the test. The average production rate (based on the daily averages) shall be not less than 84 pph. Liquid nitrogen production shall be continued at maximum rate for not less than 72 hrs after reaching rated production capacity. Operation time during which product is not being delivered at an average rate equal to or above the production rate required by 3.7.1 shall not be credited toward completion of the required production time.

4.5.6.3.9 CONCURRENT LIQUID NITROGEN AND GASEOUS OXYGEN PRODUCTION.- Upon completion of the liquid nitrogen production test and without stopping or discontinuing operation, the generating and charging plant shall be changed over to produce liquid nitrogen and gaseous oxygen simultaneously, and operated in accordance with 4.5.6.2 through 4.5.6.2.4 until the rates at which it will continuously and concurrently produce liquid nitrogen of the specified quality and gaseous oxygen of the specified quality have been established for for each of the ratios required by 4.5.6.3.1. The time required to make the changeover from liquid nitrogen to concurrent liquid nitrogen and gaseous oxygen production, the length of operation time necessary to bring the generating and charging plant into production at the rate

required by 3.7.1.2 for each of the specified ratios, the maximum liquid nitrogen and gaseous oxygen production rates achieved for each of the specified ratios, the average liquid nitrogen and gaseous oxygen production rates for each of the specified ratios, and the average power consumption shall be individually determined and recorded for the test. The average production rate (based on the daily averages) for each of the specified ratios shall be not less than that required by 3.7.1.2. Liquid nitrogen and gaseous oxygen production shall be continued at maximum rate for not less than 24 hrs at each of the specified ratios after reaching rated production capacity for that ratio. Operation time during which product is not being delivered at an average rate equal to or above the production rate required by 3.7.1.2 shall not be credited toward completion of the required production time.

4.5.6.3.10 CONCURRENT LIQUID OXYGEN AND LIQUID NITROGEN PRODUCTION.- Upon completion of the concurrent liquid nitrogen and gaseous oxygen production test and without stopping or discontinuing operation, the generating and charging plant shall be changed over to produce liquid oxygen and liquid nitrogen simultaneously, and operated in accordance with 4.5.6.2 through 4.5.6.2.4 until the rates at which it will continuously and concurrently produce liquid oxygen of the specified quality and liquid nitrogen of the specified quality have been established for each of the ratios required by 4.5.6.3.1. The time required to make the changeover from concurrent liquid nitrogen and gaseous oxygen to concurrent liquid oxygen and liquid nitrogen production, the length of operation time necessary to bring the generating and charging plant into production at the rate required by 3.7.1.2 for each of the specified ratios, the maximum liquid oxygen and liquid nitrogen production rates achieved for each of the specified ratios, the average liquid oxygen and liquid nitrogen production rates for each of the specified ratios, and the average power consumption shall be individually determined and recorded for the test. The average production rate (based on the daily averages) for each of the specified ratios shall be not less than that required by 3.7.1.2. Liquid oxygen and liquid nitrogen production shall be continued at maximum rate for not less than 24 hrs at each of the specified ratios after reaching rated production capacity for that ratio. Operation time during which product is not being delivered at an average rate equal to or above the production rate required by 3.7.1.2 shall not be credited toward completion of the required production time.

4.5.6.4 THAWING.- Immediately upon completion of the performance demonstration and endurance test, the generating and charging plant shall be shutdown, completely thawed, and serviced as specified in the operation and maintenance instruction handbook for another approximately 30-day production period. The time required to complete the thawing and servicing shall not exceed that specified in 3.7.3.3, and shall be recorded.

4.5.7 INDIVIDUAL ACCEPTANCE TEST.- The generating and charging plant shall be erected and installed as directed by the procuring activity (see 6.2), adjusted for simultaneous liquid oxygen and gaseous nitrogen production at ratio (a) specified in 4.5.6.3.1, started, and operated under as close to the design conditions specified in 3.7.1 as practicable and in accordance with the operating conditions specified in 4.5.6.2 through 4.5.6.2.2 for not less than 100 hrs of continuously delivering liquid oxygen and gaseous nitrogen under the conditions specified in 4.4.4.1 and 4.4.4.2 at full production capacity. Operation time during which liquid oxygen and gaseous nitrogen are not actually being delivered at or above the production rates specified in 3.7.1.2 shall not be credited toward completion of the 100-hr period. All difficulties and malfunctions encountered shall be recorded in detail on the test data sheets.

4.5.8 ENVIRONMENTAL TESTING.- The generating and charging plant shall be subjected to the following environmental tests conducted in accordance with the specified procedures of MIL-E-4970:

4.5.8.1 HUMIDITY.- Equipment samples representing applicable portions of the generating and charging plant that might be damaged by exposure to humidity shall be subjected to, but not operated in, a humidity test in accordance with the procedure specified.

4.5.8.2 FUNGUS.- Equipment samples representing applicable portions of the generating and charging plant that might be damaged by exposure to fungus attack shall be subjected to a fungus-resistance test in accordance with the procedures specified.

4.5.8.3 SALT SPRAY.- Equipment samples representing applicable portions of the generating and charging plant that might be damaged by exposure to a salt atmosphere shall be subjected to a salt spray test in accordance with the procedures specified.

4.5.8.4 SAND AND DUST.- Each individual shipping package or components thereof that might be damaged by sand and dust shall be subjected to, but not operated in, a sand and dust test in accordance with the procedure specified.

4.5.8.5 RAIN.- Each component that will be installed external to the enclosing building shall be subjected to a rain test in accordance with the procedure specified.

4.5.8.6 OPERATING TEMPERATURES AND WINDLOADS.- Design criteria, analyses, or computations shall be submitted to the procuring activity that will substantiate the capability of the generating and charging

plant to withstand and function in accordance with the requirements specified herein under the following conditions:

a. Ambient temperature (outside the enclosing building) of -65° F

b. Ambient temperature (outside the enclosing building) of 125° F

c. Windloads as specified in 3.7.4.7 (applicable only to the components installed external to the enclosing building.

4.5.9 SERVICING AND MAINTENANCE TESTS.- All normal preventive maintenance and servicing operations specified in the operating and maintenance instruction handbook shall be performed to determine their adequacy, ease of accomplishment, and the accessibility of parts and assemblies for performance of same. Insofar as practicable, these operations shall be conducted as part of the normal preventive maintenance, servicings, and inspections performed in accomplishing the testing specified herein. Interferences or obstructions to servicing or preventive maintenance shall be recorded in detail on the test data sheets.

4.5.10 MECHANICAL CHECK.- Upon completion of the tests specified in 4.5.5 through 4.5.8, a critical inspection shall be made of components to determine their operability and any damage or undue wear incurred during the tests. Teardown and parts measurement shall be made only in those cases where service life is in question. Where teardown and parts measurement are performed, wear or distortion that exceeds limits permitted by the manufacturer for new parts shall be cause for considering the part or parts affected as having failed to satisfactorily complete the test.

4.5.10.1 Steel parts subject to high stress in operation and which are suspected of having defects shall also be subjected to magnetic particle inspection (magnaflux) and shall exhibit no indications or damage attributable to the tests, or shall be considered as having failed the test. Magnetic particle inspection shall be performed in accordance with MIL-I-6868.

4.5.10.2 Nonmagnetic parts suspected of defects shall be subjected to inspection with fluorescent penetrant (blacklight) and shall exhibit no defects that would impair their life or usefulness. Penetrant inspection shall be performed in accordance with MIL-I-6866.

4.6 PREPRODUCTION TESTING

4.6.1 PREPRODUCTION TEST SAMPLE TESTED BY THE CONTRACTOR.- The contractor shall subject one generating and charging plant to the preproduction testing specified in 4.6.3.

4.6.2 PREPRODUCTION TEST REPORT.- After the contractor completes the preproduction tests, he shall prepare a preproduction test report in accordance with MIL-T-9107 and furnish three complete copies of the report to the procuring activity.

4.6.3 PREPRODUCTION TESTS.- The preproduction tests shall consist of all tests described under 4.5 except the individual acceptance test specified in 4.5.7.

5. PREPARATION FOR DELIVERY

5.1 GENERAL INSTRUCTIONS

5.1.1 CLEANING.- The generating and charging plant shall be thoroughly cleaned to remove excess and spilled lubricant materials, loose or chipped paint, spilled chemicals, and other foreign materials. All cleaning solvents shall be thoroughly removed from the system and components thereof.

5.1.1.1 DEGREASING.- Generating and charging plant surfaces, parts, fittings, et cetera, that will be in contact with high-purity oxygen or nitrogen shall be thoroughly degreased by one of the following methods:

Method a. Vapor degreasing process followed by fingerprint removal, using stabilized trichlorethylene conforming to MIL-T-7003 in a standard commercial vapor degreaser. Operation of a commercial vapor degreaser shall be in accordance with the manufacturer's recommendations. The fingerprint remover shall conform to MIL-C-15074. Following application of the fingerprint remover, the surface shall be thoroughly rinsed with clean trichlorethylene. All solvents shall be removed after the cleaning operation by approved drying methods, by purging with hot filtered oil-free air or nitrogen, or by vacuum evacuation.

Method b. Solvent degreasing process followed by fingerprint removal, using stabilized trichlorethylene or commercial oxygen-safe cleaning solvent at ambient temperatures to thoroughly wash all surfaces requiring degreasing. If the solvent contains more than 1 percent of oil after cleaning and being drained from the component, the degreasing operation shall be repeated with clean solvent. Fingerprint remover used shall conform to MIL-C-15074. Following application of the fingerprint remover, the surface shall

be thoroughly rinsed with clean trichlorethylene. All solvents shall be removed after the degreasing operation by approved drying methods, by purging with hot filtered oil-free air or nitrogen, or by vacuum evacuation. Precautions shall be taken to insure that solvents do not contact plastic and other incompatible materials.

Method c. Detergent degreasing process in which the components to be cleaned are flushed with hot inhibited alkaline cleaner until free from oil, grease, and other combustible materials. Following this treatment, all surfaces (internal and external) shall be rinsed thoroughly with fresh, clean, hot water and dried by blowing with filtered and dried oil-free air or nitrogen or by baking at a temperature of 250° to 300° F until all water is removed.

5.1.1.1.1 Petroleum and other inflammable solvents shall not be used on such surfaces.

5.1.2 REPAINTING.- Generating and charging plant surfaces on which the paint is damaged or defective shall be thoroughly cleaned and repainted as specified under 3.14.

5.1.3 LUBRICATION.- All generating and charging plant machined bearing surfaces that are normally lubricated in operation, that do not come into contact with high-purity oxygen, and for which preservation requirements are not specified herein, shall be thoroughly lubricated with the recommended lubricants to be ready for immediate operation.

5.1.3.1 PRESERVATIVES.- Preservatives and lubricants shall not be applied to any part of the equipment that will come into contact with high-purity oxygen.

5.1.4 PHYSICAL PROTECTION.- Cushioning, blocking, bracing, and bolting as necessary for compliance with the requirements specified herein shall be in accordance with JAN-P-100. The drop tests of JAN-P-100 shall be waived when the drop tests of MIL-P-116 are applicable.

5.1.5 WATERPROOF-VAPORPROOF PACKAGING.- When waterproof-vaporproof packaging in accordance with method II of MIL-P-116 is specified, inspection windows located to be readily accessible shall be provided in all bags. A humidity indicator as specified in method II of MIL-P-116 shall be placed in each bag so that it is visible through the inspection window. Projecting handles, parts, fixtures, and sharp edges that might otherwise puncture the waterproof-vaporproof barrier shall be cushioned with pads of creped cellulose wadding conforming to PPP-C-843 secured in place with pressure-sensitive tape conforming to PPP-T-60.

5.1.6 SECURING FOR SHIPMENT.- Small items and packages not fastened to major components shall be secured to or packed with major components to insure against accidental loss or damage caused by movement during shipment.

5.2 PRESERVATION, PACKAGING, AND PACKING

5.2.1 LEVEL A.- The generating and charging plant shall be preserved, packaged, and packed as follows:

5.2.1.1 AIR COMPRESSOR.- The air compressor shall be preserved and packaged in accordance with MIL-P-3600.

5.2.1.2 ELECTRICAL EQUIPMENT.- The air compressor electric drive motor, controls, and other electrical equipment shall be preserved and packaged in accordance with MIL-P-16298.

5.2.1.3 AIR PROCESSING AND SEPARATION EQUIPMENT

5.2.1.3.1 INTERNAL PRESERVATION.- Preservatives shall not be applied to the interiors of the heat exchanger assemblies, expansion engine assemblies, air rectification columns, or any component that will be in contact with high-purity oxygen.

5.2.1.3.2 EXTERNAL PRESERVATION.- Outside surfaces of the air processing and separation equipment shall be cleaned in accordance with MIL-P-116, except that petroleum or other flammable solvents shall not be used or applied where they could come in contact with high-purity oxygen. Pressure gages and other instruments shall be protected by having their dial glasses covered with greaseproof barrier material conforming to MIL-B-121 and bridged with pieces of fitted plywood or other similar material secured in place with pressure-sensitive tape conforming to PPP-T-60. Critical parts and surfaces or parts and surfaces that contact oxygen shall then be preserved in accordance with method II of MIL-P-116. Shipping sections that do not contain critical parts and surfaces or parts and surfaces that contact oxygen shall be preserved by having all unprotected surfaces coated with Type P-1 preservative as specified in MIL-P-116.

5.2.1.4 LIQUID PRODUCT SERVICING SYSTEM AND GASEOUS PRODUCT SERVICING SYSTEM.- The product servicing system components shall be disassembled as necessary to permit consolidating into a readily handled shipping package. All connections and openings into the lines and other components shall be fitted with their protective caps or plugs and sealed with pressure-sensitive tape conforming to PPP-T-60. The servicing lines, charging leads, and charging hoses shall be individually wrapped with greaseproof barrier material conforming to MIL-B-121 and sealed with pressure-sensitive tape. The product servicing system components shall then be preserved in a waterproof-vaporproof package in accordance with method II of MIL-P-116.

5.2.1.5 PURITY TEST EQUIPMENT

5.2.1.5.1 CHEMICAL TEST SETS.- Chemical test set glassware shall be cleaned and dried. All metallic parts shall then be

cleaned in accordance with MIL-P-116, after which all unpainted metal surfaces thereof shall be coated with preservative as specified in MIL-P-116. All items shall then be cushioned with cellulose cushioning material conforming to PPP-C-843 in a manner that will prevent damage and minimize movement.

5.2.1.5.2 ELECTRIC AND ELECTRONIC TEST EQUIPMENT.- Electric and electronic purity measuring and other quality control equipment shall be preserved and packaged in accordance with MIL-P-17555.

5.2.1.6 DRIVE BELTS AND PULLEYS.- Drive belts shall not be removed from their pulleys unless necessary to accomplish the preservation and packaging specified herein. Tension on drive belts not removed shall be completely relieved. Removed drive belts shall be wrapped, either individually for single-belt drives or together in sets for multiple belt drives, with greasproof barrier material conforming to MIL-B-121 and sealed with pressure-sensitive tape conforming to PPP-T-60. Pulleys from which drive belts are removed shall be coated with hard-drying ignition insulation compound. Pulleys from which drive belts are not removed shall be preserved as follows:

5.2.1.6.1 A coating of hard-drying ignition insulation compound shall be applied to the portions of the pulley faces or grooves not contacted by the drive belts. When the compound is dry, strips of greaseproof barrier-material conforming to MIL-B-121 shall be placed on the pulley faces or grooves, and the pulleys and drive belts rotated until uncoated portions of the pulley faces or grooves are exposed. The preservation procedure shall be continued until the entire pulley faces or grooves have been preserved. The barrier-material shall be of such length that after the final step of preservation the material will have been compressed into the entire circumference of the pulley faces or grooves and the material securely held in place by the drive belts, after which the pulleys and drive belts shall not be rotated. Removed drive belts shall be fastened to the equipment near the pulleys on which they will be used, if practicable, and shall have waterproof tags attached indicating their proper application.

5.2.1.7 HOSES AND CABLES.- Disassembled hoses and electric cables shall be coiled to the minimum safe diameter and secured with flat, cotton tape in not less than three places. They shall then be wrapped with greaseproof barrier-material conforming to MIL-B-121 and sealed with pressure-sensitive tape conforming to PPP-T-60. Electric cables having precise electrical contact areas, female socket connections, and other critical material on which no corrosion can be tolerated shall be sealed with waterproof pressure-sensitive adhesive tape conforming to PPP-T-60, type II, class 1. The tape shall be coated with electrical ignition waterproofing varnish conforming to MIL-V-13811.

5.2.1.8 MAINTENANCE TOOLS.- Maintenance tools shall be preserved and unit packaged for extended storage in accordance with MIL-P-15424.

5.2.1.9 CONTROL PANELS.- All instrument and control dial glasses shall be covered with greaseproof barrier-material conforming to MIL-B-121 and bridged with pieces of fitted plywood or other similar material secured in place with pressure-sensitive tape conforming to PPP-T-60.

5.2.1.10 ACCESSORIES.- Generating and charging plant accessories and other similar components for which no preservation and packaging instructions are specified herein and which will not come in contact with high-purity oxygen shall be cleaned as specified in MIL-P-116. External unpainted metal surfaces shall be coated with Type P-1 preservatives as specified in MIL-P-116. Articles thus treated shall be wrapped with greaseproof barrier material conforming to MIL-B-121 and sealed with pressure-sensitive tape conforming to PPP-T-60. Items that will be in contact with high-purity oxygen in service shall be cleaned as specified in MIL-P-116, except that petroleum or other flammable solvents or preservatives shall not be applied where they could come in contact with high-purity oxygen. These items shall be preserved in waterproof-vaporproof packages as specified in method II of MIL-P-116.

5.2.1.11 SKID BASE PARTS.- Skid base parts shall be cleaned as specified in MIL-P-116, after which all unpainted surfaces shall be coated with Type P-1 preservative as specified in MIL-P-116. No further preservation or packaging of major skid base parts will be necessary. Small skid base parts such as loose bolts, nuts, washers, small bolting plates, et cetera, shall be preserved and packaged as specified for accessories, except that individual packaging will not be required.

5.2.1.12 TECHNICAL PUBLICATIONS.- Technical publications shall be packaged in accordance with MIL-P-116, method IA-8.

5.2.1.13 OTHER COMPONENTS.- All generating and charging plant components, accessories, and parts for which no preservation, packaging, and packing instructions are specified herein shall be prepared by using the applicable specifications listed in Bulletin 56. The processes proposed for use in preparation for delivery shall be submitted to the procuring activity for approval.

5.2.2 LEVEL B.- After processing in accordance with 5.1.1 through 5.1.6, the generating and charging plant shall be preserved, packaged, and packed in accordance with the manufacturer's commercial practice in a manner that will insure safe transportation at the lowest rate

to the point of delivery. Packaging material in direct contact with unprotected surfaces susceptible to damage by corrosion shall conform to MIL-B-121, MIL-P-130, MIL-A-148, or MIL-P-4185. Shipping packages shall meet Consolidated Freight Classification rules, or regulations of other common carriers, as applicable to the mode of transportation.

5.2.3 LEVEL C.- After processing in accordance with 5.1.1 through 5.1.6, the generating and charging plant shall be preserved, packaged, and packed in accordance with the manufacturer's commercial practice in a manner that will insure safe transportation at the lowest rate to the point of delivery. Shipping packages shall meet Consolidated Freight Classification rules, or regulations of other common carriers, as applicable to the mode of transportation.

5.3 MARKING OF SHIPMENT.- Interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129. The nomenclature shall be as follows:

GENERATING AND CHARGING PLANT, OXYGEN-NITROGEN,
SKID MOUNTED, A/E26A-8

6. NOTES

6.1 INTENDED USE.- The A/E26A-8 generating and charging plant covered by this specification is intended for use in producing high-purity oxygen or nitrogen for support of aircraft servicing requirements in Zone of Interior areas where:

a. Building facilities suitable for erection and operation, and which will provide adequate environmental protection, are available

b. Mobility of the equipment is not required

c. Adequate electrical power for equipment operation is available.

6.2 ORDERING DATA.- Procurement documents should specify the following:

a. Title, number, and date of this specification.

b. Whether an erection instruction manual illustrated with photographs and isometric or perspective line drawings showing clearly each successive step in field erection of the generating and charging plant should be furnished with each unit. (See 3.5.3.3.)

c. Whether a complete set of all special tools, other than common handtools and those normally available in equipment repair shops, necessary for erection, operation, servicing, and maintenance of the generating and charging plant should be provided with each generating and charging plant. (See 3.12.2.)

d. Whether instruction manuals covering operation, servicing, and maintenance of the generating and charging plant, or other technical publications (including quantities and disposition) should be provided with each unit.

e. Required levels of preservation, packaging, and packing. (See section 5.)

f. That the contractor shall, within the time specified by the contractor purchase order, furnish complete foundation and anchoring details for all components of the generating and charging plant requiring support and anchoring in excess of that provided by a smooth, level, concrete floor capable of supporting a load density of 200 psf. The foundation design and anchoring details shall be presented for soils having a maximum bearing pressure of 2 tons per square foot, and for soils having a maximum bearing pressure of 8 tons per square foot.

g. That the contractor shall, within the time specified by the contract or purchase order, furnish complete details concerning electric power, lighting, water, and other utilities that will be required during erection, test, normal operation and maintenance of the equipment.

h. The conditions under and the location at which the preproduction article generating and charging plant is to be erected and installed and subjected to the performance demonstration and endurance test. (See 4.5.6.)

i. The conditions under and the locations at which the production article generating and charging plants are to be erected and installed and subjected to the individual acceptance test. (See 4.5.7.)

6.3 DEFINITIONS.- For the purposes of this specification, the following definitions shall apply:

6.3.1 AMBIENT CONDITIONS.- Ambient conditions are the dry-bulb temperature, wet-bulb temperature, and the relative humidity of the atmospheric air surrounding, and in the vicinity of the generating and charging plant installation, but unaffected by any heat or cold emanating from the equipment or installation.

6.3.2 PRODUCTION PERIOD.- A production period is defined as a period of time during which oxygen and nitrogen products are actually being delivered at full capacity into receiving containers.

6.3.3 PRESSURES.- Unless specified as absolute or denoted by the symbol psia, all pressures referred to herein will be interpreted as pounds per square inch (psi) gage.

Notice. When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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CONTRACT SALES APR 4 1960

| AMENDMENT TO REQUEST FOR PROPOSALS | PAGE NUMBER 1 | NUMBER OF PAGES 2 |
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| AMENDMENT NO. | DATE AMENDMENT ISSUED |
|---|---|
| 1 | 29 March 1960 |
| ISSUING OFFICE<br>Hq, Memphis Air Force Depot<br>United States Air Force<br>Directorate, Procurement & Production<br>BUYER: Mr. Everett P. Stewart, MPPPV<br>3300 Jackson Avenue<br>Memphis, Tennessee | RFP NO.<br>RFP 40-604-60-5386<br>DATE RFP ISSUED<br>18 March 1960<br>DATE OF CLOSING<br>2 May 1960 |
| ITEM Type A/E26A-8 Oxygen Nitrogen Generating Plants | PURCHASE AUTHORIZATION<br>MP-60-3655-40820L, Amendments 1 & 2 |

THE ABOVE RFP IS AMENDED AS FOLLOWS *(All Other Terms and Conditions Remain Unchanged)*:

1. Subject Request For Proposal is amended to incorporate the following changes and clarifications:

   a. Delete any reference to "Air Transportable". Air transportability is not required.

   b. Items 1 and 2 shall be priced F. O. B. Origin.

   c. Item 3 shall be priced to include all transportation costs, in addition to loading, unloading, installing, erecting and acceptance testing, from origin to and at the sites listed in Item 3.

   d. PART VI - REQUIRED DELIVERY SCHEDULE:
   Item 1 - availability extended from one hundred and twenty (120) days to one hundred and eighty (180) days.

(Continued on Page 2)

THE CLOSING DATE FOR RECEIPT OF PROPOSALS ☒ IS NOT EXTENDED; ☐ IS EXTENDED

UNTIL THE CLOSE OF BUSINESS ON _____ DATE _____

NOTICE TO OFFERORS

OFFERORS MUST ACKNOWLEDGE RECEIPT OF THIS AMENDMENT PRIOR TO THE CLOSE OF BUSINESS ON THE DATE SET FORTH ABOVE, BY ONE OF THE FOLLOWING METHODS:

a. BY SIGNING AND RETURNING 2 COPIES OF THIS AGREEMENT.
b. BY A NOTATION ACKNOWLEDGING RECEIPT OF THIS AMENDMENT ON EACH COPY OF THE PROPOSAL SUBMITTED.
c. BY SEPARATE LETTER OR TELEGRAM WHICH INCLUDES A REFERENCE TO THE RFP NUMBER AND AMENDMENT NUMBER.

FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE CLOSE OF BUSINESS ON THE DATE SET FOR RECEIPT OF PROPOSALS MAY RESULT IN YOUR PROPOSAL NOT BEING ACCEPTED.

IF, BY VIRTUE OF THIS AMENDMENT, IT IS DESIRED TO MODIFY A PROPOSAL ALREADY SUBMITTED, SUCH MODIFICATION MAY BE MADE BY TELEGRAM OR LETTER, PROVIDED SUCH TELEGRAM OR LETTER MAKES REFERENCE TO THIS AMENDMENT AND IS RECEIVED PRIOR TO THE CLOSING DATE SPECIFIED ABOVE.

| FULL NAME OF OFFEROR *(Type or Print)* | SIGNATURE OF PERSON AUTHORIZED TO SIGN |
|---|---|
| ADDRESS | TYPE OR PRINT SIGNER'S NAME AND TITLE |

DD FORM 1 DEC 68 746S

☆ U. S. GOVERNMENT PRINTING OFFICE: 1968-0-294106

AMENDMENT NO. 1 TO REQUEST FOR PROPOSALS 40-604-60-5386

First Article Test Report submission extended from one hundred and eighty (180) days to two hundred and forty (240) days.

Items 1 and 2. Quantity changed to read -
5 Each, on or before 100 days from receipt of First Article Approval.
6 Each, additional, on or before 130 days from receipt of First Article Approval.
8 Each, additional, each subsequent thirty days to contract completion.

e. PART IX - F. O. B. POINT, Inspection and Acceptance.
Items 1, 2 and 3, delete in entirety and substitute the following therefor:

"Items 1, 2 and 3 - In place and operationally approved by the Government, at the applicable sites specified in Part I, Item 3."

f. PART X - TRANSPORTATION CHARGES AND GOVERNMENT BILLS OF LADING.
Items 1, 2 and 3, delete in entirety and substitute the following therefor:

"Item 1 - Transportation costs not applicable.
Item 2 - Transportation costs not applicable.
Item 3 - Transportation Costs to be included in the price of Item 3."

g. Except as hereby modified, either expressly or by necessary implication, all the terms, covenants, and conditions of the proposal affected shall continue in full force and effect.

2. Amendment No. 1 to Request for Proposal 40-604-60-5386 is incorporated into and becomes an official attachments to said proposal: One completely executed copy of Amendment No. 1 shall accompany each copy of the priced proposal submitted.

REQUEST FOR PROPOSALS AND PROPOSAL *(Negotiated Fixed Price Contract)* | Form Approved. Bureau No. 22-R-335

| ISSUED BY | DEPARTMENT |
|---|---|
| Hq, Memphis Air Force Depot<br>United States Air Force<br>Directorate, Procurement & Production | Air Force mm |
| ADDRESS ATTN: MPPPV-1<br>3300 Jackson Avenue<br>Memphis, Tennessee | REQUISITION NUMBER OR PURCHASE AUTHORITY<br>MP-60-3655-40820L, Amendments 1 & 2 |

APPROPRIATION AND OTHER ADMINISTRATIVE DATA

Appropriation and Administrative Data will be furnished in acceptance.

REQUEST FOR PROPOSALS

| DATE ISSUED | REQUEST FOR PROPOSAL NUMBER |
|---|---|
| 18 March 1960 | RFP 40-604-60-5386 Class 3655 |

(1 original & 1 carbon)

WRITTEN PROPOSALS IN Duplicate. SUBJECT TO (1) THE TERMS AND CONDITIONS OF THIS REQUEST FOR PROPOSALS, (2) THE ATTACHED SCHEDULE, (3) GENERAL PROVISIONS *(Standard Form 32,* OSA 57 *edition)*, WHICH ARE INCORPORATED HEREIN BY REFERENCE, AND (4) SUCH OTHER CONTRACT PROVISIONS AND SPECIFICATIONS AS ARE ATTACHED OR INCORPORATED BY REFERENCE IN THE SCHEDULE, WILL BE RECEIVED AT THE ABOVE OFFICE UNTIL THE CLOSE OF BUSINESS *(date)* 2 May 1960, FOR FURNISHING THE SUPPLIES OR SERVICES SET FORTH IN THE ACCOMPANYING SCHEDULE.

GENERAL INFORMATION AND INSTRUCTIONS RELATIVE TO PROPOSALS ARE CONTAINED IN THE TERMS AND CONDITIONS ON THE REVERSE HEREOF.

PROPOSAL | DATE OF PROPOSAL

IN COMPLIANCE WITH THE ABOVE, THE UNDERSIGNED OFFERS AND AGREES, IF THIS PROPOSAL BE ACCEPTED WITHIN 60 CALENDAR DAYS (60 *calendar days unless a different period be inserted by the offeror*) AFTER THE LAST DATE FOR RECEIPT OF PROPOSALS AS INDICATED IN THE REQUEST FOR PROPOSALS, TO FURNISH ANY OR ALL OF THE ITEMS UPON WHICH PRICES ARE QUOTED, AT THE PRICE SET OPPOSITE EACH ITEM, DELIVERED AT THE DESIGNATED POINTS AND WITHIN THE TIME SPECIFIED IN THE SCHEDULE OF THE REQUEST FOR PROPOSALS.

*Proposals specifying less than 60 days acceptance time may not be acceptable.

OFFEROR REPRESENTS: *(Check appropriate boxes)*

(1) THAT IT ☐ IS, ☐ IS NOT, A SMALL BUSINESS CONCERN. *(See definition on reverse hereof.)* IF OFFEROR IS A SMALL BUSINESS CONCERN AND IS NOT THE MANUFACTURER OF THE SUPPLIES OFFERED, IT ALSO REPRESENTS THAT ALL SUPPLIES TO BE FURNISHED HEREUNDER ☐ WILL, ☐ WILL NOT, BE MANUFACTURED OR PRODUCED BY A SMALL BUSINESS CONCERN IN THE UNITED STATES, ITS TERRITORIES, ITS POSSESSIONS, OR THE COMMONWEALTH OF PUERTO RICO.

(2) THAT IT IS A ☐ REGULAR DEALER IN, ☐ MANUFACTURER OF, THE SUPPLIES OFFERED.

(3) THAT IT ☐ HAS, ☐ HAS NOT, EMPLOYED OR RETAINED ANY COMPANY OR PERSON *(other than a full-time bona fide employee working solely for the offeror)* TO SOLICIT OR SECURE THIS CONTRACT, AND *(b)* THAT IT ☐ HAS, ☐ HAS NOT, PAID OR AGREED TO PAY ANY COMPANY OR PERSON *(other than a full-time bona fide employee working solely for the offeror)* ANY FEE, COMMISSION, PERCENTAGE OR BROKERAGE FEE, CONTINGENT UPON OR RESULTING FROM THE AWARD OF THIS CONTRACT; AND AGREES TO FURNISH INFORMATION RELATING TO *(a)* AND *(b)* ABOVE AS REQUESTED BY THE CONTRACTING OFFICER. *(For interpretation of the representation, including the term "bona fide employee," see Code of Federal Regulations, Title 41, Part 1.)*

(4) THAT IT OPERATES AS AN ☐ INDIVIDUAL, ☐ PARTNERSHIP, ☐ CORPORATION, INCORPORATED IN THE STATE OF _____.

(SEE RFP PROVISIONS A AND B HEREOF)

| DISCOUNTS ALLOWED BY OFFEROR FOR PROMPT PAYMENT | ___ percent, 10 CALENDAR DAYS; ___ percent, 20 CALENDAR DAYS; ___ percent, 30 CALENDAR DAYS |
|---|---|

| FULL NAME AND BUSINESS ADDRESS OF OFFEROR *(Street, city, zone, and state)* *(Type or print)* | TELEPHONE NUMBER<br>SIGNATURE OF PERSON AUTHORIZED TO SIGN PROPOSAL<br>TYPED OR PRINTED SIGNER'S NAME AND TITLE |
|---|---|

DD FORM 1 MAY 58 746 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

TERMS AND CONDITIONS OF REQUEST FOR PROPOSALS

1. ACCEPTANCE - *(a)* The Government may accept any item or group of items of any proposal unless qualified by specific limitation of the offeror.

*(b)* Unless otherwise provided in the schedule, proposals may be submitted for any quantities less than those specified and the Government reserves the right to make an award on any item for a quantity less than the quantity proposed at the unit price offered unless the offeror specifies otherwise in its proposal.

*(c)* The Government may accept within the time specified therein, any proposal *(or part thereof as provided in (a) and (b) above)*, whether or not there are negotiations subsequent to its receipt, unless the proposal is withdrawn in writing prior to acceptance. Such subsequent negotiations shall not constitute a rejection or counter offer on the part of the Government.

*(d)* It is contemplated that a contract will be awarded to that responsible offeror whose proposal will be most advantageous to the Government, price and other factors considered. The right is reserved to accept other than the lowest proposal and to reject any or all proposals.

*(e)* An Acceptance of Proposal mailed *(or otherwise furnished)* to the successful offeror within the time for acceptance and upon the terms specified in the proposal shall be deemed to result in a binding contract, without further action by either party.

*(f)* Any cost or financial analysis data submitted with any proposal hereunder or any representation concerning facilities or financing shall not form a part of any resulting contract.

2. LABOR INFORMATION - Attention is invited to the possibility that wage determinations may have been made under the Walsh-Healey Public Contracts Act providing minimum wages for employees engaged in the manufacture for sale to the Government of the supplies covered by this Request for Proposals. Information in this connection, as well as general information as to the requirements of the Act concerning overtime payment, child labor, safety and health provisions, etc., may be obtained from the Wage and Hour and Public Contracts Divisions, Department of Labor, Washington 25, D.C. Requests for information should state the Request for Proposals number, the issuing agency and the supplies covered.

3. DISCOUNTS - *(a)* Prompt payment discounts will be included in the evaluation of proposals, provided the period of the offered discount is sufficient to permit payment within such period in the regular course of business under the delivery, inspection, and payment provisions of the Request and Proposal.

*(b)* In connection with any discount offered, time will be computed from date of delivery of the supplies to carrier when delivery and acceptance are at point of origin, or from date of delivery at destination or port of embarkation when delivery and acceptance are at either of those points, or from date correct invoice or voucher is received in the office specified by the Government if the latter date is later than the date of delivery. Payment is deemed to be made, for the purpose of earning the discount, on the date of mailing of the Government check.

4. PRICES - Unit price for each unit on which an offer is made shall be shown and such unit price shall include packing unless otherwise specified.

5. DELIVERY TIME - When not otherwise specified, offeror must definitely state time of proposed delivery.

6. COMPUTATION OF TIME - Time, if stated as number of days, will include Sundays and holidays.

7. GOVERNMENT-FURNISHED PROPERTY - No material, labor, or facilities will be furnished by the Government unless otherwise provided in the Schedule.

8. AGENTS - Proposals signed by an Agent must be made in the name of the Principal and must be accompanied by evidence of the Agent's authority.

9. PROPOSALS - *(a)* Data. Each offeror shall furnish the information required by the Request for Proposals form. The offeror should print or type his name on the Schedule and each Continuation Sheet thereof upon which he makes an entry.

*(b)* Corrections. Erasures or other changes in Proposals made by offeror must be explained or otherwise noted over signature of offeror.

*(c)* Late Proposals. The Government reserves the right to consider proposals or modifications thereof received after the date indicated for such purpose, but before award is made, should such action be in the interest of the Government.

*(d)* Mistake. In case of mistake in extension of price, the unit price will govern.

*(e)* Addressing. Proposals and modifications thereof shall be enclosed in sealed envelopes addressed to the issuing office, with the name and address of the offeror and the Request for Proposals number on the face of the envelope.

10. NO PROPOSAL - In the event no proposal is to be submitted, DO NOT return the Request for Proposals, together with the drawings and specifications, unless otherwise specified. However, a letter or postcard should be sent to the issuing office advising whether future solicitations for the type of supplies or services covered by this Request for Proposals are desired.

11. SELLER'S INVOICES - Invoices shall be prepared and submitted in quadruplicate unless otherwise specified, and shall contain the following information: Contract Number, Order Number *(if any)*, and Item Number, contract description of supplies or services, sizes, quantities, unit prices, and extended totals. Bill of Lading Number and weight of shipment will be shown for shipments on Government Bills of Lading.

12. DEFINITION OF SMALL BUSINESS - Generally, a small business concern for the purpose of Government procurement is a concern that (1) is not dominant in its field of operation and, with its affiliates, employs fewer than 500 employees, or (2) is certified as a small business concern by the Small Business Administration. *(See Code of Federal Regulations, Title 13, Part 101, as amended, which contains the detailed definition and related procedures.)*

DD FORM 746r

REQUEST FOR PROPOSALS AND PROPOSAL *(Negotiated Fixed Price Contract)* — Form Approved, Budget Bureau No. 29-R-325

| ISSUED BY | DEPARTMENT |
|---|---|
| Hq, Memphis Air Force Depot<br>United States Air Force<br>Directorate, Procurement & Production | Air Force nns |
| ADDRESS ATTN: MPPPV-1<br>3300 Jackson Avenue<br>Memphis, Tennessee | REQUISITION NUMBER OR PURCHASE AUTHORITY<br>MP-60-3655-40820L, Amendments 1 & 2 |

APPROPRIATION AND OTHER ADMINISTRATIVE DATA

Appropriation and Administrative Data will be furnished in acceptance.

REQUEST FOR PROPOSALS

| DATE ISSUED | REQUEST FOR PROPOSAL NUMBER |
|---|---|
| 18 March 1960 (1 original & 1 carbon) | RFP 40-604-60-5386 Class 3655 |

WRITTEN PROPOSALS IN Duplicate, SUBJECT TO (1) THE TERMS AND CONDITIONS OF THIS REQUEST FOR PROPOSALS, (2) THE ATTACHED SCHEDULE, (3) GENERAL PROVISIONS *(Standard Form 32, Oct. 57 edition)*, WHICH ARE INCORPORATED HEREIN BY REFERENCE, AND (4) SUCH OTHER CONTRACT PROVISIONS AND SPECIFICATIONS AS ARE ATTACHED OR INCORPORATED BY REFERENCE IN THE SCHEDULE, WILL BE RECEIVED AT THE ABOVE OFFICE UNTIL THE CLOSE OF BUSINESS *(date)* 2 May 1960, FOR FURNISHING THE SUPPLIES OR SERVICES SET FORTH IN THE ACCOMPANYING SCHEDULE.

GENERAL INFORMATION AND INSTRUCTIONS RELATIVE TO PROPOSALS ARE CONTAINED IN THE TERMS AND CONDITIONS ON THE REVERSE HEREOF.

PROPOSAL — DATE OF PROPOSAL

1.

IN COMPLIANCE WITH THE ABOVE, THE UNDERSIGNED OFFERS AND AGREES, IF THIS PROPOSAL BE ACCEPTED WITHIN ____ CALENDAR DAYS (*60 calendar days unless a different period be inserted by the offeror*) AFTER THE LAST DATE FOR RECEIPT OF PROPOSALS AS INDICATED IN THE REQUEST FOR PROPOSALS, TO FURNISH ANY OR ALL OF THE ITEMS UPON WHICH PRICES ARE QUOTED, AT THE PRICE SET OPPOSITE EACH ITEM, DELIVERED AT THE DESIGNATED POINTS AND WITHIN THE TIME SPECIFIED IN THE SCHEDULE OF THE REQUEST FOR PROPOSALS.

*Proposals specifying less than 60 days acceptance time may not be acceptable.

OFFEROR REPRESENTS: *(Check appropriate boxes)*

(a) THAT IT ☐ IS, ☐ IS NOT, A SMALL BUSINESS CONCERN. *(See definition on reverse hereof.)* IF OFFEROR IS A SMALL BUSINESS CONCERN AND IS NOT THE MANUFACTURER OF THE SUPPLIES OFFERED, IT ALSO REPRESENTS THAT ALL SUPPLIES TO BE FURNISHED HEREUNDER ☐ WILL, ☐ WILL NOT, BE MANUFACTURED OR PRODUCED BY A SMALL BUSINESS CONCERN IN THE UNITED STATES, ITS TERRITORIES, ITS POSSESSIONS, OR THE COMMONWEALTH OF PUERTO RICO.

(b) THAT IT IS A ☐ REGULAR DEALER IN, ☐ MANUFACTURER OF, THE SUPPLIES OFFERED.

(c) THAT IT ☐ HAS, ☐ HAS NOT, EMPLOYED OR RETAINED ANY COMPANY OR PERSON *(other than a full-time bona fide employee working solely for the offeror)* TO SOLICIT OR SECURE THIS CONTRACT, AND *(b)* THAT IT ☐ HAS, ☐ HAS NOT, PAID OR AGREED TO PAY ANY COMPANY OR PERSON *(other than a full-time bona fide employee working solely for the offeror)* ANY FEE, COMMISSION, PERCENTAGE OR BROKERAGE FEE, CONTINGENT UPON OR RESULTING FROM THE AWARD OF THIS CONTRACT; AND AGREES TO FURNISH INFORMATION RELATING TO *(a)* AND *(b)* ABOVE AS REQUESTED BY THE CONTRACTING OFFICER. *(For interpretation of the representation, including the term "bona fide employee," see Code of Federal Regulations, Title 41, Part 1-1.)*

(d) THAT IT OPERATES AS AN ☐ INDIVIDUAL, ☐ PARTNERSHIP, ☐ CORPORATION, INCORPORATED IN THE STATE OF _____.

(SEE RFP PROVISIONS A AND B HEREOF)

DISCOUNTS ALLOWED BY OFFEROR FOR PROMPT PAYMENT: ____ percent, 10 CALENDAR DAYS; ____ percent, 20 CALENDAR DAYS; ____ percent, 30 CALENDAR DAYS

| FULL NAME AND BUSINESS ADDRESS OF OFFEROR *(Street, city, zone, and state) (Type or print)* | TELEPHONE NUMBER |
|---|---|
| | SIGNATURE OF PERSON AUTHORIZED TO SIGN PROPOSAL |
| | TYPED OR PRINTED SIGNER'S NAME AND TITLE |

DD FORM 746 — PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

## TERMS AND CONDITIONS OF REQUEST FOR PROPOSALS

1. ACCEPTANCE - *(a)* The Government may accept any item or group of items of any proposal unless qualified by specific limitation of the offeror.

*(b)* Unless otherwise provided in the schedule, proposals may be submitted for any quantities less than those specified; and the Government reserves the right to make an award on any item for a quantity less than the quantity proposed at the unit price offered unless the offeror specifies otherwise in its proposal.

*(c)* The Government may accept within the time specified therein, any proposal *(or part thereof as provided in (a) and (b) above)*, whether or not there are negotiations subsequent to its receipt, unless the proposal is withdrawn in writing prior to acceptance. Such subsequent negotiations shall not constitute a rejection or counter offer on the part of the Government.

*(d)* It is contemplated that a contract will be awarded to that responsible offeror whose proposal will be most advantageous to the Government, price and other factors considered. The right is reserved to accept other than the lowest proposal and to reject any or all proposals.

*(e)* An Acceptance of Proposal mailed *(or otherwise furnished)* to the successful offeror within the time for acceptance and upon the terms specified in the proposal shall be deemed to result in a binding contract, without further action by either party.

*(f)* Any cost or financial analysis data submitted with any proposal hereunder or any representation concerning facilities or financing shall not form a part of any resulting contract.

2. LABOR INFORMATION - Attention is invited to the possibility that wage determinations may have been made under the Walsh-Healey Public Contracts Act providing minimum wages for employees engaged in the manufacture for sale to the Government of the supplies covered by this Request for Proposals. Information in this connection, as well as general information as to the requirements of the Act concerning overtime payment, child labor, safety and health provisions, etc., may be obtained from the Wage and Hour and Public Contracts Divisions, Department of Labor, Washington 25, D.C. Requests for information should state the Request for Proposals number, the issuing agency and the supplies covered.

3. DISCOUNTS - *(a)* Prompt payment discounts will be included in the evaluation of proposals, provided the period of the offered discount is sufficient to permit payment within such period in the regular course of business under the delivery, inspection, and payment provisions of the Request and Proposal.

*(b)* In connection with any discount offered, time will be computed from date of delivery of the supplies to carrier when delivery and acceptance are at point of origin, or from date of delivery at destination or port of embarkation when delivery and acceptance are at either of those points, or from date correct invoice or voucher is received in the office specified by the Government if the latter date is later than the date of delivery. Payment is deemed to be made, for the purpose of earning the discount, on the date of mailing of the Government check.

4. PRICES - Unit price for each unit on which an offer is made shall be shown and such unit price shall include packing unless otherwise specified.

5. DELIVERY TIME - When not otherwise specified, offeror must definitely state time of proposed delivery.

6. COMPUTATION OF TIME - Time, if stated as number of days, will include Sundays and holidays.

7. GOVERNMENT-FURNISHED PROPERTY - No material, labor, or facilities will be furnished by the Government unless otherwise provided in the Schedule.

8. AGENTS - Proposals signed by an Agent must be made in the name of the Principal and must be accompanied by evidence of the Agent's authority.

9. PROPOSALS - *(a)* Data. Each offeror shall furnish the information required by the Request for Proposals form. The offeror should print or type his name on the Schedule and each Continuation Sheet thereof upon which he makes an entry.

*(b)* Corrections. Erasures or other changes in Proposals made by offeror must be explained or otherwise noted over signature of offeror.

*(c)* Late Proposals. The Government reserves the right to consider proposals or modifications thereof received after the date indicated for such purpose, but before award is made, should such action be in the interest of the Government.

*(d)* Mistake. In case of mistake in extension of price, the unit price will govern.

*(e)* Addressing. Proposals and modifications thereof shall be enclosed in sealed envelopes addressed to the issuing office, with the name and address of the offeror and the Request for Proposals number on the face of the envelope.

10. NO PROPOSAL - In the event no proposal is to be submitted, DO NOT return the Request for Proposals, together with the drawings and specifications, unless otherwise specified. However, a letter or postcard should be sent to the issuing office advising whether future solicitations for the type of supplies or services covered by this Request for Proposals are desired.

11. SELLER'S INVOICES - Invoices shall be prepared and submitted in quadruplicate unless otherwise specified, and shall contain the following information: Contract Number, Order Number *(if any)*, and Item Number, contract description of supplies or services, sizes, quantities, unit prices, and extended totals. Bill of Lading Number and weight of shipment will be shown for shipments on Government Bills of Lading.

12. DEFINITION OF SMALL BUSINESS - Generally, a small business concern for the purpose of Government procurement is a concern that (1) is not dominant in its field of operation and, with its affiliates, employs fewer than 500 employees, or (2) is certified as a small business concern by the Small Business Administration. *(See Code of Federal Regulations, Title 13, Part 101, as amended, which contains the detailed definition and related procedures.)*

DD FORM 746r

U. S. GOVERNMENT PRINTING OFFICE 1958 O—488187

RFP 40-604-60-5386

SPECIAL TERMS AND CONDITIONS OF RFP

NOTE 1: NOTICE TO OFFERORS:
This procurement is being placed thru negotiation procedures as distinguished from formal advertising; however, the term "Negotiation" as used herein shall not be interpreted or construed as meaning that offerors will be given the opportunity to revise or lower their original offer or otherwise modify their original proposal(s). Competitive Offers are being solicited. Offerors are cautioned to carefully review all terms and conditions and specifications of this Request for Proposal prior to submission of the offer. The Contracting Officer may consider the offeror's original offer as final without extending the privilege to modify or revise the offer, or conduct further negotiations.

NOTE 2: TECHNICAL PROPOSALS:
A technical proposal providing information, concerning, but not limited to, provisions, experience, outline drawings, and schematic diagrams of proposed design, outline of test program and personnel briefs, is required by this Request for Proposal. The technical proposal shall be prepared to include all the requirements listed in Schedule Part II herein, and submitted to the issuing office either with the priced proposal or separately provided that receipt is not later than the date herein established as the last date for receipt of proposals. Proposals will be evaluated and award(s) made on the basis of price, engineering concepts in the technical proposal, delivery and other considerations as the best interest of the Government may require.

NOTE 3: PROPOSAL SUBMISSION DATE:
The date specified herein for receipt of proposal(s) in response to this Request for Proposal may be extended as the interest of the Government may require, however, any extension will be granted uniformly to all offerors.

NOTE 4: PROPOSALS ON PARTIAL QUANTITIES:
Proposals on quantities less than specified in this Request for Proposal will be considered non-responsive.

NOTE 5: CONTRACT AWARD:
All items awarded will be awarded to a single offeror.

NOTE 6: FINANCIAL AND TECHNICAL ABILITY:
If the proposal submitted in response to this Request for Proposal is favorably considered, a survey team may contact your facility for the purpose of determining your technical and financial ability to perform. Current financial statements and other data pertinent to this purpose should be available at that time if not already on file with the Air Materiel Command. The team will also evaluate your system for determining the financial and technical ability of your proposed subcontract or procurement sources to perform.

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NOTE 6: FINANCIAL AND TECHNICAL ABILITY: (CONTINUED)
Examples of the type of technical, financial and other capability matters the survey team visiting your facility will evaluate are given below.

1. Past experience with firm (if any)
2. Financial strength
3. Accounting system
4. Facilities
5. Plant loading
6. Production control system
7. Material control system
8. Ability to meet required delivery schedule
9. Receiving and inspection
10. Purchasing system
11. Subcontracting
13. Realism of lead time estimates
14. Scrap and rework control procedures
15. Packing and shipping
16. Facilities and procedures for storing and handling Government furnished property
17. General housekeeping
18. Manpower availability and labor relations
19. Engineering capability
20. Management controls
21. Any other areas pertinent to the proposal.

NOTE 7: TERMS AND CONDITIONS:
Bidders are cautioned to examine carefully all of the terms and conditions set forth in this Request for Proposal.

NOTE 8: INFORMATION:
The name of the Buyer to be contacted concerning this Request for Proposal is Mr. Everett F. Stewart, MPPPV, Telephone GLendale 8-4411, Extension 334 or 380.

NOTE 9: BIDDER'S QUALIFICATIONS:
Bidder must be regularly engaged in the manufacture and delivery of equipment of the type or category covered by the procurement data; must possess adequate financial resources, technical ability, and equipment to accomplish the task; must have an organization capable of carrying the contract to completion; and must have established a satisfactory record in the past for completion of contracts of similar character and extent. The Contracting Officer shall be the judge of the facts submitted in support of bidder's claims as to competency. The fact that drawings and specifications may have been furnished to bidders will not limit the Government's right to judge as to competency after bids have been received.

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PART 1 - ARTICLES AND SUPPLIES TO BE FURNISHED

ITEM 1 — FIRST ARTICLE

Type A/E26A-8 Oxygen-Nitrogen Generating and Charging Plant, skid mounted, air transportable; for production of high purity oxygen and/or nitrogen, both liquid and gaseous, to support aircraft servicing requirements; to be designed and fabricated by the contractor in accordance with Specification MIL-G-27253A (USAF) dated 8 March 1960 incorporated herein by reference as implemented by Part V herein, and in conformance to Qualified Products List No. 25959-2, dated 26 January 1959, attached hereto and made a part hereof. This First Article shall be subjected by the contractor to all the preproduction tests specified in Specification MIL-G-27253A (USAF) dated 8 March 1960, in the manner provided by and as implemented by Part III herein.

| Qty | Unit | Unit Price | Total Price |
|---|---|---|---|
| 1 | Each | X X X | |

ITEM 2 — PRODUCTION

Type A/E26A-8 Oxygen-Nitrogen Generating and Charging Plant, to be identical to the plant comprising Item 1, above, as approved by the Government, in the quantities within the following increments.

| | | |
|---|---|---|
| Bid A - 20 to 30 inclusive | Ea. $ _____ | *** |
| Bid B - 31 to 40 inclusive | Ea. $ _____ | *** |
| Bid C - 41 to 50 inclusive | Ea. $ _____ | *** |
| Bid D - 51 to 60 inclusive | Ea. $ _____ | *** |
| Bid E - 61 to 70 inclusive | Ea. $ _____ | *** |

***The Bidder must insert a unit price for Bid "A", a unit price for Bid "B", a unit price for Bid "C", a unit price for Bid "D", and a unit price for Bid "E". The Government reserves the right to make award under Bid "A" or Bid "B" or Bid "C" or Bid "D" or Bid "E" for any quantity, within such bids, at the unit price stated by the bidder. Award will be made under Bid "A" or Bid "B" or Bid "C" or Bid "D" or Bid "E" but not under more than one of such bids. Bidder should not insert a total amount opposite these items (under Item 2) as the correct total amount will be determined and inserted in the award schedule by the Contracting Officer.

ITEM 3 — ERECTION AND OPERATIONAL CHECKOUT

The generating plants to be furnished under Items 1 and 2 above, are to be contractor loaded, transported, unloaded, installed and erected in accordance with the requirements set forth in Paragraph 3.5.3.3. of Specification MIL-G-27253A (USAF) dated 8 March 1960 as implemented by Part V herein. Installation shall be performed within the space limitations of Government furnished buildings (see Strategic Air Command Drawing No."SAC SKETCH 11-11-59", dated 17 November 1959, revised by SAC 7 December 1959), on Government owned sites. The contractor shall furnish all the required engineering services, technical supervision, labor, equipment, tools, materials and supplies necessary to perform the above stated actions, and in

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PART 1 - ARTICLES AND SUPPLIES TO BE FURNISHED (Continued)

ITEM ERECTION AND OPERATIONAL CHECKOUT

3 (Continued)
addition and within the same scope, conduct the operational checkout in accordance with the requirements of Paragraph 4.3, entitled Acceptance Testing of Specification MIL-G-27253A (USAF) dated 8 March 1960. At the conclusion of the acceptance testing the contractor shall submit a certified test report in triplicate and in accordance with Specification MIL-T-9107 to the Procuring Contracting Officer for evaluation of acceptance or rejection. Acceptance or rejection of that plant or plants by the Administrative Contracting Officer shall be predicated on the test report evaluation. All the above actions (pertinent to Item 3) shall be performed at the following sites, and at the prices set forth opposite each site:

| Air Force | Base | Qty | Unit | Unit Price | Total Price |
|---|---|---|---|---|---|
| SAC | AFB3018 CHANUTE, ILL. | * | 1 Ea.<br>2 Ea.<br>3 Ea. | | |
| SAC | AFB4629 HOMESTEAD, FLA. | 2 | Ea. | | |
| SAC | AFB 4633 RAMEY, PUERTO RICO | 2 | Ea. | | |
| SAC | AFB 4658 MCCOY, ORLANDO, FLORIDA | 1 | Ea. | | |
| SAC | AFB 4642 TURNER AFB ALBANY, GA | 1 | Ea. | | |
| SAC | AFB 4622 COLUMBUS AFB, MISSISSIPPI | 1 | Ea. | | |
| SAC | AFB 4634 BLYTHEVILLE, ARKANSAS | 1 | Ea. | | |
| SAC | AFB4660 LITTLE ROCK, ARKANSAS | 2 | Ea. | | |
| SAC | AFB4608 BARKSDALE,LA | 2 | Ea. | | |
| SAC | AFB4657 BERGSTROM AFB AUSTIN,TEXAS | 1 | Ea. | | |
| SAC | AFB4687 CARSWELL, FT WORTH, TEXAS | 3 | Ea. | | |
| SAC | AFB4631 CLINTON SHERMAN AFB, OKLAHOMA | 1 | Ea. | | |
| SAC | AFB4639 BIGGS AFB, TEX | 2 | Ea. | | |

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PART 1 - ARTICLES AND SUPPLIES TO BE FURNISHED (Continued)

ITEM ERECTION AND OPERATIONAL CHECKOUT

3 (Continued)

| Air Force | Base | Qty | Unit | Unit Price | Total Price |
|---|---|---|---|---|---|
| SAC | AFB4664 MARCH AFB, CALIF. | 2 | Ea. | | |
| SAC | AFB4672 CASTLE AFB, CALIFORNIA | 3 | Ea. | | |
| SAC | AFB4626 MALMSTROM AFB, GREAT FALLS, MONTANA | 1 | Ea. | | |
| SAC | AFB2509 GLASGOW AFB, MONTANA | 2 | Ea. | | |
| SAC | AFB4625 WHITEMAN AFB SEDALIA, MO. | 2 | Ea. | | |
| SAC | AFB4654 BUNKER HILL AFB PERU, INDIANA | 2 | Ea. | | |
| SAC | AFB4656 LOCKBOURNE AFB COLUMBUS, OHIO | 3 | Ea. | | |
| SAC | AFB2585 WURTSMITH AFB OSCODA, MICH | 2 | Ea. | | |
| SAC | AFB4665 WESTOVER AFB, MASS. | 2 | Ea. | | |
| SAC | AFB4623 PEASE AFB NEW HAMPSHIRE | 3 | Ea. | | |
| SAC | AFB4632 DOW AFB BANGER, MAINE | 1 | Ea. | | |
| SAC | AFB4678 LORING AFB LIMESTONE, MAINE | 3 | Ea. | | |
| SAC | AFB4685 HARMON AFB STEVENVILLE, NEWFOUNDLAND | 1 | Ea. | | |
| SAC | AFB4684 GOOSE AB, LABRADOR | 1 | Ea. | | |
| SAC | AFB4688 FROBISHER RCAF, CANADA | 1 | Ea | | |

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PART 1 - ARTICLES AND SUPPLIES TO BE FURNISHED (Continued)

| ITEM | ERECTION AND OPERATIONAL CHECKOUT | | | | | |
|---|---|---|---|---|---|---|
| 3 | (Continued) | | | | | |
| | Air Force | Base | Qty | Unit | Unit Price | Total Price |
| | SAC | CHURCHILL MONITABA, CANADA | 1 | Ea. | | |
| | SAC | COLD LAKE ALBERTA, CANADA | 1 | Ea. | | |
| | SAC | NANAO ALBERTA, CANADA | 1 | Ea. | | |
| | ADC | AFB2508, MINOT AFB N. DAKOTA | 1 | Ea. | | |
| | ADC | AFB2509, GRAND FORKS AFB, N. DAKOTA | 1 | Ea. | | |
| | ADC | AFB2511 K.I. SAWYER AIRPORT GWINN, MICHIGAN | 2 | Ea. | | |
| | ADC | AFB2598, KINCHELOE AFB MICHIGAN | 1 | Ea. | | |
| | AC | | | | | |
| | AMC | AFB2310 GRIFFISS AFB NEW YORK, N. Y. | 1 | Ea. | | |
| | ATC | AFB3020 SHEPPARD AFB, TEXAS | 1 | Ea. | | |
| | ATC | AFB3071, AMARILLO AFB, AMARILLO, TEXAS | 1 | Ea. | | |
| | ADC | AFB2569, MCCHORD AFB WASHINGTON | 2 | Ea. | | |
| | AAC | AFB5004, EIELSON AFB FAIRBANKS, ALASKA | 1 | Ea. | | |
| | AAC | AFB5000, ELMENDORF AFB, ANCHORAGE, ALASKA | 1 | Ea. | | |
| | ADC | AFB2525, OTIS AFB, MASSACHUSETTS | 1 | Ea. | | |
| | ADC | AFB2596 SELFRIDGE AFB, MICHIGAN | 1 | Ea. | | |
| | MTC | AFB4497, DOVER AFB, DELAWARE | 1 | Ea. | | |
| | MTC | AFB4484, MCGUIRE AFB NEW JERSEY | 1 | Ea. | | |

*QTY FOR CHANUTE WILL VARY WITH QTY PROCURED.
1 EACH FOR 25 OR LESS
2 EACH FOR 45
3 EACH FOR 70

The above sequence of sites will not vary, but will be in the same proportion to the quantity procured under Items 1 and 2 of Part I.

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PART 1 - ARTICLES AND SUPPLIES TO BE FURNISHED (Continued)

ITEM KITS

4 Spare Parts Kits, for immediate support of Items 1 and 2 above, to consist of High Mortality items, not to exceed a total monetary value of $2000.00 per kit. One (1) each kit shall be packed with and accompany each plant comprising Items 1 and 2, above. No Government stock number will be assigned these kits. Contents are to be selected by the contractor and submitted for approval to the Procuring Contracting Officer, prior to release to procurement and or production. Price of the kits shall be negotiated by the contractor and the Administrative Contracting Officer immediately subsequent to the time contents are approved.

| Qty | Unit | Unit Price | Total Price |
|---|---|---|---|
| Identical to the quantity procured on Items 1 & 2 above. | Each | To be negotiated at a later date. | |

ITEM SPARE PARTS

5 Maintenance Spare Parts to support Items 1 and 2, above, for approximately 17½ months, may be required at a later date, and, if required are to be selected by provisioning action in accordance with Form MCP 71-673, January 1959 incorporated herein by reference and as supplemented by AMC Form 263, September 1959 and AMC Form 321B, July 1956, attached hereto and made a part hereof, in a total estimated amount equal to twenty percent of the total basic price of Items 1 and 2, above.

| Qty | Unit | Unit Price | Total Price |
|---|---|---|---|
| 1 | Lot | N/A | Subject to the Governments determination of requirements which action shall not be in excess of one (1) year from receipt of contract award. |

Bidder should not insert an amount for items 4 and 5 above, as the correct amount will be determined by negotiation action; however, the bidder, by submission of this proposal, agrees to furnish the requirements of items 4 and 5, above, as provided herein.

ITEM D,I,D.

6 Descriptive Identification Data, applicable to Item 5, above, to be furnished in accordance with Specification MIL-D-26715B, dated 1 January 1960, attached hereto and made a part hereof.

| Qty | Unit | Unit Price | Total Price |
|---|---|---|---|
| 1 | Lot | N/A | Included in the price of Item 5. |

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PART 1 - ARTICLES AND SUPPLIES TO BE FURNISHED (Continued)

ITEM 6 — D.I.D. (Continued)

Bidder should not insert an amount for this Item 6, as the price is to be included in the price of Item 5, above; however, the bidder, by submission of this proposal agrees to furnish this data as provided herein.

ITEM 7 — SPECIAL TOOLS

Special tools and/or Ground Handling Equipment for Items 1 and 2, above, required for the removal, installation and overhaul of components, in accordance with "Ground Support Equipment and Spare Parts therefor Provisioning Document for USAF Contracts", identified as MCP 71-650 dated 30 January 1958, incorporated herein by reference, at a total estimated price equal to approximately 1% of the total basic price of Items 1 and 2 above. To be selected at a later date by provisioning action, and priced by negotiation immediately subsequent. Bidder should not enter an amount for this Item 7, but, by submission of this proposal agrees to furnish the requirement in the manner set forth above.

| Qty | Unit | Unit Price | Total Price |
|---|---|---|---|
| X | X | X X-X | |

Bidder should not insert an amount for this Item 7, as the quantity will be in direct proportion to the quantity of plants procured from Items 1 and 2, above, if the requirements are determined by the Government, within a period of one hundred and eighty days (180) from date of contract award, to exist.

ITEM 8 — ENGINEERING DATA

Engineering Data and microfilm in accordance with Form MCP 71-77, dated 1 June 1959, entitled "Engineering Data Requirements for USAF Materiel and Supplies" Issue 1, attached hereto and made a part hereof.

| Qty | Unit | Unit Price | Total Price |
|---|---|---|---|
| 1 | Lot | X X X | |

ITEM 9 — HANDBOOKS

Technical Publications (Maintenance Handbooks) consisting of (a) Operation and Service Instructions, (b) Overhaul Instructions, (c) Illustrated Parts Breakdown, all in accordance with MCMSP Exhibit No. 1-10, Pages 1, 2 and 3, attached hereto and made a part hereof.

| Qty | Unit | Unit Price | Total Price |
|---|---|---|---|
| 1 | Lot | X X X | |

RFP 40-604-60-5386

PART 1 - ARTICLES AND SUPPLIES TO BE FURNISHED (Continued)

ITEM 10 — PLANS

Within the space limitations set forth in Strategic Air Command Drawing, SAC SKETCH 11-11-59, revised 7 December 1959, the contractor shall furnish necessary data and drawings for each site covering the arrangement within the building and specifying foundation facilities required for installation and utilization of a generating plant fabricated in accordance with Specification MIL-G-27253A. Criteria for facilities shall include:

a. Equipment criteria and specification pertaining to:
   (1) Arrangement or layout of equipment.
   (2) Equipment weight and loadings.
   (3) Anchor bolt locations and information.
   (4) Product outlet locations, type and size of connections, etc.
   (5) Air intake and exhaust locations and conditions.
b. Electric motor ratings, horsepower and voltage.
c. Total connected electrical load and peak demand.
d. Lighting arrangement if requirements are special.
e. Utility requirements, including cooling water and instrument air (flow rate, pressure and temperature).

| Qty | Unit | Unit Price | Total Price |
|---|---|---|---|
| 1 | Lot | X X X | |

ITEM 11 — PHOTOGRAPHS

Photographs and negatives of the first production unit of Item 2, above, in accordance with MPM Exhibit No. 1 revised 16 March 1959, attached hereto and made a part hereof.

| Qty | Unit | Unit Price | Total Price |
|---|---|---|---|
| 1 | Lot | X X X | |

PART II - TECHNICAL PROPOSAL:

1. Submission of a Technical Proposal is a requirement. Reference to the bidders price shall not be made in the technical proposal. The technical proposal shall be prepared and submitted as an addendum to the bidders proposal and the submission date shall be identical to the required submission date of Request for Proposal 40-604-60-5386. The Technical Proposal, in order to be given engineering evaluation, shall be specific, complete and in conformance to the format of the basic specification MIL-G-27253A, and shall be practical, legible, coherent and at a minimum contain the following:

(a) General experience and background of the bidder on similar cryogenics projects. Specifications, description and/or catalog sheets, photographs, technical descriptions and other technical data on identical or similar projects shall be furnished to support the proposal.

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PART II - TECHNICAL PROPOSAL (Continued)

(b) An outline of the problems anticipated in complying with the specification requirements, and of the approach or approaches to be applied to the solution of these problems; this must be sufficient to indicate the bidders complete understanding and consideration of the engineering problems involved; general and specific approaches and principles involved, with justification for the methods selected, which the bidder expects to apply in complying with requirements.

(c) Outline drawings and sketches of the overall generating plant and major components thereof, showing major dimensions, arrangement, configuration and component installation, location of servicing connections and disconnect fittings and other major physical features, including the manufacturer and part number of each major functional commercial component.

(d) Schematic diagrams for the generating plant showing components, piping, connections, controls, protective devices, valves, gauges, instruments and other components, including identification of known commercial functional items.

(e) A detailed description of the electrical power and other utilities required for the operation of the generating plant under the conditions specified in Specification MIL-G-27253A.

(f) An explanation of the control operations and functions which will provide for compliance with the performance requirements of Specification MIL-G-27253A, under the therein specified operation and environmental conditions.

(g) A written statement that the bidder will comply fully with all the requirements of Specification MIL-G-27253A.

(h) Performance literature or, when not available, performance details on the following components:

Air and/or nitrogen compressors and drives
Refrigeration equipment
Air and/or gas expansion engines and/or turbines
Air processing and separation equipment
Purity analysis equipment

(i) An outline of the test program proposed for compliance with the requirements of Section 4 of Specification MIL-G-27253A. The outline shall describe the proposed test setup, procedures, instrumentation, and facilities for each test; shall specify which tests would be conducted by the bidder and which tests would be subcontracted; and shall list any additional test equipment or facilities that the bidder would have to acquire for fulfilling the requirements. The name of the subcontractor and the location at which the subcontractor would conduct the testing shall be specified for each test which the bidder indicates he would not perform.

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PART II - TECHNICAL PROPOSAL (Continued)

(j) Within the space limitations of SAC SKETCH 11-11-59 revised 7 December 1959, furnish complete foundation and anchoring details for all components of the plant requiring support and anchoring; in addition show in detail any excess of that provided by a smooth, level concrete floor capable of supporting a load density of 200 psx. The foundation design and anchoring details shall be presented for soils having a maximum bearing pressure of 2 tons per square foot, and for soils having a maximum bearing pressure of 8 tons per square foot.

2. Failure of a bidder to furnish the specified technical proposal or, that furnished which indicates the resulting unit will not fulfill the design and performance requirements of Specification MIL-G-27253A, (USAF) dated 8 March 1960, shall result in disqualification of the bidder as a potential source. Data previously submitted will not be given consideration.

Reservation of Rights: The Government reserves the right to accept other than the lowest priced proposal and to reject any or all proposals.

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PART III - FIRST ARTICLE APPROVAL (Applicable to Item 1, ONLY)

(a) Immediately upon receipt of Contract or Notice of Award, the contractor shall proceed to produce the unit comprising Item 1, Part I, which shall be subjected by the contractor to all preproduction tests required by Specification MIL-G-27253A (USAF) dated 1 January 1960 as implemented by Part V hereto, both incorporated herein and made a part hereof. All facilities and technical personnel required for conducting such tests shall be provided for by the contractor without additional cost to the procuring agency, (Department of the Air Force). Such testing shall be conducted under the surveillance of an authorized assigned Government Quality Control Inspector and such other Government personnel as the Government may desire to have present to witness the testing. At least ten (10) days prior to commencing such testing, the contractor shall furnish written notification to the Administrative Contracting Officer assigned to this contract, and to the Commander, Hq, Memphis Air Force Depot, Memphis, Tennessee, Attn: MPPPV, advising the date(s) and location(s) that such testing will be conducted, in order that representatives of the Government may be present and witness the testing. In the event the above required tests or any inspection which the Government may make reveals deficiencies in the unit of Item 1, Part I, the Contractor shall, without additional cost to the Government, make such corrections as are necessary to make the unit of Item 1, Part I conform to the contract specification requirements and Government approval, and repeat any necessary tests to demonstrate such conformance; provided, however, that anything contained in this Paragraph (a) shall not be construed as authorizing any extension of time required for submission of the test report required by Paragraph (c) below, or delivery of any other supplies to be furnished under the contract.

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PART III - FIRST ARTICLE APPROVAL (Applicable to Item 1, ONLY) (Continued)

(b) If, as a result of testing of the unit of Item 1, the Government determines changes in specifications are required, such changes shall be processed in accordance with the General Provisions Clause 2, "Changes".

(c) Immediately upon completion of the required tests to be performed on the unit of Item 1, as set forth in paragraph (a) above, the contractor shall submit a Certified Test Report, in duplicate, countersigned by an Authorized Government Inspector, prepared in accordance with Specification MIL-T-9107 (USAF) incorporated herein by reference, to the Commander, Wright Air Development Division, Attn: WCLERSG, Wright-Patterson Air Force Base, Ohio, for evaluation, and determination of approval or rejection by the Contracting Officer. At the time said test report is submitted, the contractor shall furnish a copy of the test report transmittal letter to the Commander, Memphis Air Force Depot, Attn: MEPPV, 3300 Jackson Avenue, Memphis, Tennessee.

(d) If the contractor fails to deliver the First Article, comprising Item 1, Part I, for testing within the time set forth elsewhere herein, or any extension thereof, the contractor shall be deemed to have failed to make delivery within the meaning of subparagraphs (a) (1) of Clause 11 hereof entitled "Default".

(e) Immediately upon written notification of approval of the First Article (or Preproduction) Test Report by the Procuring Contracting Officer the unit comprising item 1, Part I shall become a contract item which the contractor shall refurbish and/or recondition prior to submission for preliminary inspection to the Air Force Quality Control Representative, as provided elsewhere herein.

(f) If, following any submission or re-submission under this clause, the tests reveal discrepancies in the First Article (or Preproduction) unit from the specification requirements, the Government may, at its option, either (1) terminate the contract in accordance with the terms of the General Provisions Clause entitled "Default", or, notify the contractor in writing of the discrepancies and thence negotiate for consideration an extension of delivery time, in which event the contractor shall correct and resubmit the First Article within thirty calendar days, at no additional cost to the Government.

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PART IV - APPROVAL OF CONTRACTOR'S PROPOSED TEST PROGRAM (Applicable to Item 1, Part I, ONLY)

The contractor shall submit three (3) copies of the proposed First Article Test Program to the Contracting Officer at Memphis Air Force Depot, Attn: MPPPV, for evaluation and written approval. The contractor's proposed test program shall include (i) list of tests to be performed, (ii) complete test procedures for each test, (iii) list of test equipment to be used, identified to manufacturer and type number, and (iv) a copy of each data record form to be utilized in recording test data. Failure of this contractor to submit its proposed test program in the manner heretofore set forth, and/or within the period of time specified elsewhere herein, and/or to cure or rectify any and all defects in such program within ten (10) days after receipt of notice from the Contracting Officer specifying such defects shall constitute grounds for termination of the Contract for default in accordance with General Provisions, Clause 11 entitled "Default".

PART V - SPECIFICATION IMPLEMENTATIONS AND OPTION CLARIFICATIONS

1. Governing Specification MIL-G-27253A (USAF) dated 8 March 1960 is implemented as follows:

(a) Paragraph 3.5.3.3. Installation Provisions is revised to read:- "Paragraph 3.5.3.3. Installation Provisions: Complete plans for layout and installation of the equipment within the building area specified in 3.5, in the form of a commercial type erection instruction manual, illustrated with photographs and isometric or perspective line drawings showing clearly each successive step in field erection of the generating and charging plant shall be furnished with each plant. This manual shall be made available to the assigned Administrative Contracting Officer at the site(s) and erection shall be in strict compliance with the manual." The preceding applies also to paragraph 6.2.b.

(b) Paragraph 6.2.c. A complete set of all special tools, other than common hand tools normally available in equipment repair shops, necessary for erection, operation, servicing and maintenance of the generating and charging plant will be provided with each unit of Items 1 and 2 of Part I, hereto, as set forth in Item 7, Part I.

Paragraph 6.2.d. Instruction manuals covering operation, servicing and maintenance of the generating and charging plant, or other technical publications will be provided with each plant as indicated in Item 9 - Part I.

Paragraph 6.2.e. Preservation, Packaging, Packing and Marking are indicated in Part VIII.

Paragraph 6.2.f. & g. That the contractor shall furnish complete foundation and anchoring details is indicated in Item 10 - Part I.

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PART V - SPECIFICATION IMPLEMENTATIONS AND OPTION CLARIFICATIONS (Continued)

Paragraph 6.2.h. & i. Erection and acceptance testing is indicated in Item 3 - Part I.

Paragraph 2.1. All reference to USAF Drawing 55C6000 shall be deleted and USAF Drawing 59C6671 shall be substituted therefor.

Paragraph 3.7.1.4. entitled Delivery Temperature, delete last word fifth line (temperature) and substitute "pressure" therefor.

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PART VI - REQUIRED DELIVERY SCHEDULE

The Government requires delivery of the articles called for herein, as follows:

Item 1 - The First Article shall be available for inception of First Article (Preproduction) testing not later than one hundred and twenty (120) days subsequent to receipt of contract award.

The First Article (Preproduction) Test Report shall be submitted for evaluation on or before one hundred and eighty (180) days subsequent to receipt of contract award.

The approved and reconditioned First Article, prepared for delivery in accordance with Paragraph 5 of Specification MIL-G-27253A shall be available for delivery on or before sixty (60) days subsequent to receipt of approval of First Article Test Report.

Items 2 & 3 - Priority of shipment shall be identical to the sequence set forth in Item 3, Part I; Contractor shall have fabricated, loaded, transported, unloaded, installed, erected and acceptance tested (operational checkout) within the time limits specified below:

5 Each, on or before 100 days from receipt of First Article Approval.
8 Each, on or before 130 days from receipt of First Article Approval.
10 Each, on or before 160 days from receipt of First Article Approval.
10 Each thirty days thereafter to contract completion.

Item 4 - Concurrent with shipment of Item 1 and each unit of Item 2.

Item 5 - If required, shall be in accordance with the Supplemental Agreement No. 1, to be negotiated subsequent to the provisioning conference by the Administrative Contracting Officer assigned to administer the contract.

Item 6 - If required shall be in accordance with Specification MIL-D-26715B dated 1 January 1960 and Part XXXVII hereto.

Item 7 - concurrent with shipment of Item 1 and each unit of Item 2.

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PART VI - REQUIRED DELIVERY SCHEDULE (Continued)

Item 8 - In accordance with Engineering Requirements Data Table MCP 71-77 - 1 June 1959.

Item 9 - Concurrent with shipment of Item 1 and each unit of Item 2.

Item 10 - One (1) complete set for each site set forth in Item 3, Part I, on or before ninety (90) days subsequent to receipt of contract award.

Item 11 - To the consignees set forth in MPM Exhibit No. 1 concurrent with date of shipment of first unit of Item 2, Part I.

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PART VII - ACCELERATED DELIVERY:
The contractor will be authorized to exceed the delivery rates, or to complete performance of any segment of the ensuing contract, prior to the stated time therefor.

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PART VIII - PRESERVATION, PACKAGING, PACKING AND MARKING
(a) Preservation, packaging, packing and marking of the supplies and services to be furnished under this proposal shall be as follows:

Items 1, 2, 4 and 7, in accordance with MCP 71-163, Page 1 and attachment No. 1, thereto, both attached hereto and made a part hereof.

Item 3 - Not Applicable.

Item 5 - In accordance with Supplemental Agreement No. 1, to be negotitated subsequent to the provisioning conference, by the Administrative Contracting Officer assigned to administer the contract.

Item 6 - In accordance with Specification MIL-D-26715B (USAF) dated 1 January 1960.

Item 8 - In accordance with Engineering Data Table MCP 71-77 - 1 June 1959.

Item 9 - In accordance with paragraph 5.2.1.12. of Specification MIL-G-27253A.

Item 10 - In accordance with paragraph 5.2.1.12 of Specification MIL-G-27253A.

Item 11 - In accordance with the contractors standard commercial practice.

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PART VIII - PRESERVATION, PACKAGING, PACKING AND MARKING (Continued)

(b) Marking shall be in conformance with MCP Form 71-53 dated September 1950, attached hereto and made a part hereof.

(c) The price of preservation, packaging, packing and marking shall be included in the price of the item.

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PART IX - F. O. B. POINT, INSPECTION AND ACCEPTANCE

The F.O.B. point and place of final inspection and acceptance for the articles and/or work specified under Part I hereto shall be as follows:

Items 1, 2 and 3 - In place and operational at the applicable sites specified in Part I, Item 3.

Items 4, 5, 7 and 10 - In accordance with paragraph (a) of General Provisions Clause 29, "Shipments", hereof.

Item 6 - In accordance with Specification MIL-D-26715B (USAF).

Item 8 - In accordance with paragraph 5.d. of Engineering Data Table MCP 71-77.

Item 9 - In accordance with MCMSP Exhibit No. 1-10.

Item 11 - Destinations specified in MPM Exhibit No. 1.

In all instances inspection shall be accomplished by an authorized Air Force Quality Control Representative and shall consist of insuring technical accuracy and quality of all work performed in conjunction with accepted industrial sampling techniques.

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PART X - TRANSPORTATION CHARGES AND GOVERNMENT BILLS OF LADING

Item 1 - To be included in the Price of Item 1.
Item 2 - To be included in the price of Item 2.
Item 3 - Not applicable.
Items 4, 5, 6, 7, 8 and 10 - shall be made on Government Bills of Lading.
Items 9 and 11 - to be shipped at contractor's expense and included in price of the articles.

When items are to be shipped on Government Bills of Lading, the contractor shall make application for necessary Government Bills of Lading to the Transportation Officer, Memphis Air Force Depot, United States Air Force, Memphis 2, Tennessee, Attn: MPSTAT. The aforementioned addressee is the cognizant transportation activity as contemplated by General Provision Clause 29 hereof.

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PART XI - SHIPPING INSTRUCTIONS

(a) Shipping instructions, to the extent not included herein, will be furnished at a later date upon application by the contractor to Memphis Air Force Depot, Attn: MPSD, thirty (30) days prior to a firm schedule date.

(b) Shipping instructions not utilized within sixty (60) days shall be reconfirmed.

(c) Material Inspection and Receiving Reports (DD 250) will specifically show the following information:

1. Purchase Request Number.
2. Contract Number.
3. Air Force Shipping Order Number.
4. Federal Stock Number (Applicable FSN will be furnished prior to scheduled delivery.)
5. Contract Item Number.
6. USAF Registration Number.
7. Bill of Lading Number.

(d) A separate DD Form 250 shall be prepared for each Air Force Shipping Order Number.

(e) Immediately upon shipment of any applicable item, it is requested that five (5) additional copies of DD Form 250, above normal distribution, be forwarded to Memphis Air Force Depot, Attn: MPSDR and MPSLLL, in turn.

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PART XII - USAF REGISTRATION NUMBERS

At least sixty (60) days prior to completion of manufacture of the first production vehicle the contractor will submit a request thru the Administrative Contracting Officer to Memphis Air Force Depot, Attn: MPSGRW for registration numbers for the entire number of plants on the contract. The following information will be submitted:

Stock Number
Type
Year of Manufacture
Contract Number

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PART XIII - RELEASE OF NEWS INFORMATION

No news release, or public announcement, or denial or confirmation of same, on any phase of this program will be made without the prior written approval of the Commander, Memphis Air Force Depot, (MPG). Should the proposed contractor ascertain that the best

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PART XIII - RELEASE OF NEWS INFORMATION (Continued)

interest of the Government would be served by the release of information, it is directed that the exact text of the proposed release, together with complete substantiation of the desirability of releasing the information, be submitted to the Commander, Memphis Air Force Depot for clearance.

PART XIV - SECURITY REQUIREMENTS

Pursuant to Paragraph 5.b of "Industrial Security Manual for Safeguarding Classified Information", the Contracting Officer may modify contractor's responsibilities for security with respect to any work being performed hereunder within the confines of a military installation. Such modification shall be in accordance with requirements of the Commander of such military installation, and shall be transmitted to the contractor by the Contracting Officer by Change Order to the contract. If such modification results in an increase or decrease in security costs under the contract, an appropriate increase or decrease of the contract price hereunder shall be negotiated and evidenced by a supplemental agreement to the contract.

PART XV - SAFETY AND ACCIDENT PREVENTION

In performing any work resulting from this proposal on premises which are under the direct control of the Government, the contractor shall, (i) conform to all safety rules and requirements prescribed in Air Force Manual 32-3 as in effect on the date of the contract and (ii) take such additional precautions as the Contracting Officer may reasonably require for safety and accident prevention purposes. The contractor agrees to take all reasonable steps and precautions to prevent accidents and to preserve the life and health of the contractor and Government personnel performing or in any manner coming in contact with the performance of the contract on such premises. Any violation of such rules and requirements, unless promptly corrected, as directed by the Contracting Officer, shall be grounds for termination of the contract in accordance with the default provisions hereof.

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PART XVI - WARNING LABELS FOR HAZARDOUS CHEMICALS

Containers of hazardous chemicals furnished to the Government or used by the Contractor in the performance of the contract in whole or in part on the premises under the control of the Government shall have affixed to such containers in a conspicious place applicable warning labels in substantially the same wording as is set forth in Manual L-1 published by the Manufacturing Chemists" Association, Inc., entitled "Warning Labels," as in effect on the date of the contract. Information concerning any warning label will be furnished to the Contractor by the Contracting Officer upon request. The use of such labels shall be in addition to any other requirements of Federal, State and local laws or regulations.

PART XVII - GOVERNING PROVISIONS

The rights and obligations of the parties to this contract shall be subject to and governed by the Schedule and the General Provisions. To the extent of any inconsistency between the Schedule or the General Provisions, and any specifications or other provisions which are made a part of this contract by reference or otherwise, the Schedule and General Provisions shall control, to the extent of any inconsistency between the Schedule and the General Provisions, the Schedule shall control.

PART XVIII - INTERCHANGEABILITY

In the interest of economy and to provide effective management, it is the desire of the Air Force that all like accessories and/or like spare parts being procured on this contract and/or any amendments thereto be identical and 100% interchangeable.

PART XIX - ENGINEERING CHANGE PROCEDURE

It is hereby agreed that any engineering changes in connection with the performance of this contract shall be processed by the Contractor in accordance with ANA Bulletin No. 391A dated 4 October 1956.

PART XX - EQUIPMENT WARRANTY

In addition to any other rights granted under this contract, the Contractor grants to the Government the same warranty on the items procured, hereunder that is customarily given to its commercial customers.

PART XXI - PRICE WARRANTY

The contractor warrants that the prices of the items set forth herein, or by reference hereto, do not exceed those charged by the contractor to any other customer purchasing the same items or equipment in like or smaller quantities.

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PART XXII - PLACE OF PERFORMANCE

Contractor shall indicate the location of the plant or establishment where the principal work will be performed in the event a contract is awarded as a result of this proposal.

Name

Street City State

PART XXIII - SUBCONTRACTING

Contractor represents that the estimated percentage of subcontracting contemplated on this procurement is _____per cent. (NOTE: The "percentage of subcontracting" will be reported as a percentage of the prime contractor's selling price. "Subcontracting" means only contracts for the production of or work upon an item, component, or assembly and does not include: (i) any purchase of a standard commercial or catalog item, (ii) any purchase of a basic raw material, (iii) any purchase of supplies or services for the general operation of the contractor's plant(s), or (iv) any purchase from a parent subsidiary or affiliate of the contractor.

PART XXIV - BUY AMERICAN CERTIFICATE

The Contractor hereby certifies that each end product, except the end products excluded below, is a domestic source end product (as defined in the contract clause entitled "Buy American Act"); and that components of unknown origin have been considered to have been mined, produced or manufactured outside the United States.

EXCLUDED ITEMS:_____

In the foregoing paragraph "United States" means the States, the District of Columbia, Hawaii, Puerto Rico, American Samoa, The Canal Zone, The Virgin Islands, Guam, and any other areas subject to the complete sovereignty of the United States.

PART XXV - GOVERNMENT FURNISHED PROPERTY AND FACILITIES

The following services available at the site, and supplies necessary for the erection, installation and operational checkout tests will be furnished at no cost by the Government.

a. Public utilities, limited to electric power and lighting, water, heat and non-toll telephone service.

b. Liquid Nitrogen necessary to purge storage tanks, liquid disposal tank and transfer lines.

c. Removal of liquid oxygen from the storage tanks to any other location.

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PART XXV - GOVERNMENT FURNISHED PROPERTY AND FACILITIES (Continued)

d. The Government will provide adequate liquid oxygen storage facilities at the generator site at all times during operation of the generator.

e. Buildings of proper type and structure in which the plants are to be installed.

PART XXVI - CONTRACTOR PERSONNEL

The proposed contractor covenants that the employees to be used in the performance of this contract will be as efficient as the average for the class of labor employed by the contractor for this particular type of work. Personnel employed by the Contractor for the performance of this contract shall be under the contractor's direction and control. The Government will conduct quality control inspection, as required, in order to insure understanding and compliance with operating instructions.

PART XXVII - APPROVAL

Any contract in excess of $30,000.00 awarded as a result of this request for proposal shall contain the following approval clause:

"This Contract shall be subject to the written approval of the Secretary of the Air Force or his duly authorized representative and shall not be binding until so approved."

PART XXVIII - DEFENSE ORDER RATING

Any contract resulting from this request for proposal will be subject to the provisions of the National Production Authority and will be assigned a DO rating.

PART XXIX - PROGRESS PAYMENTS

The need for progress payments conforming to regulations (22 Federal Register 826-838; Code of Federal Regulations, Title 32, Ch 1, Subch. 9, Part 82; AR 715.6 NPD 31, AFR 173-133) will not be considered as a handicap or adverse factor in the award of a contract hereunder. Offerors desiring progress payments in accordance with the Progress Payments Clause attached hereto, shall include a written request therefor in their proposals, and proposals including requests for progress payments will be evaluated on an equal basis with proposals not including a request for progress payments. The percentage to be inserted in A, B, C, D and E of Progress Payments Clause shall be 70%.

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PART XXX - OFFEROR REPRESENTATION

Offeror Represents: (One of the following shall be executed by the Offeror as applicable.)

That the aggregate number of employees of the Offeror and its affiliates is 500 or more, and has not been certified by SBA as a small business concern. ☐

That the Offeror is not dominant in its field of operation and with affiliates employs fewer than 500 employees. ☐

That the Offeror is certified as a small business concern by SBA for the purpose of Government procurement. ☐

"Number of Employees" except as SBA otherwise determines in a particular industry or part hereof, means the average employment of any concern and its affiliates based on the number of persons employed during the pay period ending nearest the 15th of the third month in each calendar quarter for the preceding four quarters. If a concern has not been in existence for four full calendar quarters, "Number of Employees" means the average employment of such concern and its affiliates during the period such concern has been in existence based on the number of persons employed during the pay period ending nearest the 15th of each month.

PART XXXI - CONTINGENT FEE REPRESENTATION

The Offeror (contractor) represents: (a) that he___ has, ___ has not employed or retained any company or person (other than a full-time bona fide employee working solely for the offeror (contractor) to solicit or secure this contract and (b) that he ____ has, ____ has not, paid or agreed to pay to any company or person (other than a full time bona fide employee working for the offeror (contractor) any fee, commission, percentage or brokerage fee; contingent upon or resulting from the award of this contract; and agrees to furnish information relating thereto as requested by the Contracting Officer. (NOTE: For interpretation of the representation, including the term "bona fide employee", see General Services Administration Regulations, Title 41, Secs 150.7 and 150.5 (d), Fed Reg. Dec 31, 1952, Volume 17, No. 253.)

PART XXXII - CONTINGENT FEE INFORMATION

If the Offeror represents that he has employed or retained a company or person (other than a full time employee) to solicit or secure this contract, he may be requested by the Contracting Officer to furnish a completed Standard Form 119, "Contractor's Statement of Contingent or Other Fees for Soliciting or Securing Contract". If the Offeror has previously furnished a completed Standard Form 119, "Contractor's

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PART XXXII - CONTINGENT FEE INFORMATION (continued)

Statement of Contingent or Other Fees for Soliciting or Securing Contract", to the office issuing this Request for Proposal, he may accompany his proposal with a signed statement (a) indicating when such completed form was previously furnished, (b) identifying by number the previous proposal, bids, or contract, if any, in connection with which such forms was submitted, and (c) representing that the statements in such form are applicable to this bid.

PART XXXIII - CONTRACT INFORMATION FORM:

Offeror represents (Check appropriate box)

Offeror does not have a Basic Agreement with the Air Force, which is contemplated to remain in effect for a period of sixty (60) days herefrom. ☐

Offeror has Basic Agreement AF _____ which is contemplated to remain in effect for a period of sixty (60) days herefrom. (Offeror will furnish copy of Basic Agreement, and amendments thereto, with proposal if convenient.) ☐

Name of Offeror By Title

_____ _____ _____

PART XXXIV - AUTHENTICITY

Each copy of the proposal shall be signed by an individual authorized to bind the contractor's organization contractually. The proposals shall be addressed to Commander, Memphis Air Force Depot, United States Air Force, Attn: MPPPV, 3300 Jackson Avenue, Memphis, Tennessee.

PART XXXV - NON-COMMITMENT

This Request for Proposal does not commit the Government to pay any cost incurred in the submission of a proposal or in making necessary studies or designs for the preparation thereof, nor to procure or contract for the services or supplies specified in this Request for Proposal.

While this Request for Proposal does not constitute a commitment on the part of the Government that an award will be made as a result of the proposals submitted, it is contemplated, however, that the evaluation of proposals received will result in the selection of a Contractor for negotiation of a contract. The Contractor so selected will not be reimbursed for any costs incurred prior to legal award.

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PART XXXVI - ROYALTY INFORMATION

When the response to this solicitation contains costs or charges for royalties totaling more than $250, the following information shall be furnished with the offer, proposal, or quotation on each separate item of royalty or license fee:

(i) Name and address of licensor;
(ii) Date of license agreement;
(iii) Patent numbers, patent application serial numbers or other basis on which the royalty is payable;
(iv) Brief description, including any part or model numbers of each contract item or component on which the royalty is payable;
(v) Percentage or dollar rate of royalty per unit;
(vi) Unit price of contract item;
(vii) Number of units; and
(viii) Total dollar amount of royalties.

In addition, if specifically requested by the contracting officer prior to execution of the contract, a copy of the current license agreement and identification of applicable claims of specific patents shall be furnished.

PART XXXVII - DESCRIPTION IDENTIFICATION DATA

(a) The Contractor shall furnish identification data in accordance with Specification MIL-D-26715B (USAF) and Federal Standard 5 for Spare Parts to be selected and furnished under provisioning procedures as established by Item 5, subject to the Governments determination of requirements. The price for furnishing such data shall be included in the price of said Spare Parts. Any delay in the part of the Government to adhere to this time cycle set forth in the Specification shall be considered an excusable delay within the meaning of the clause of this proposal entitled "Default". Any such excusable delay will automatically extend the delivery schedule of this data, by the time of the delay.

(b) Item Description for Spare Parts shall be forwarded to applicable Depots having Prime responsibility for the individual items. Item description for Memphis Prime items shall be forwarded by the Contractor to: Commander, Memphis Air Force Depot, Attn: MPSJCI, Mallory Air Force Depot, 3300 Jackson Avenue, Memphis, Tennessee.

(c) Within 20 days from the date of award of this contract the Contractor shall furnish the model number(s) he has assigned or will assign to the item(s) he is required to furnish under this contract. The model number(s) shall be furnished in writing in triplicate to the Administrative Contracting Officer.

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PART XXXVII - DESCRIPTION IDENTIFICATION DATA (Continued)

(d) Not later than 20 days prior to the furnishing of pre-production model for testing, if pre-production testing is required, or if no pre-production model is required not later than 30 days after date of award of this contract, the contractor shall furnish in writing in triplicate the applicable completed descriptive patterns in order that the Government may establish Federal standard nomenclature and assign appropriate Federal Stock Number(s) for the item(s) to be furnished under this contract. The Government reserves the right to refuse acceptance of pre-production model for testing until 20 days have elapsed, or if no pre-production model is required, refuse to accept deliveries until 60 days have elapsed, after receipt by the Government from the contractor of satisfactory descriptive pattern information. Completed descriptive patterns shall be furnished in writing in triplicate to the contracting officier's authorized representative.

(e) After receipt of the data as required under (a) and (b) above prior to the shipment of any of the units required to be delivered under this contract, the Government may modify this contract in accordance with the clause of this contract entitled "Changes", so as to incorporate therein the Federal Stock Number and the Federal standard nomenclature made applicable to the item(s) being furnished under this contract. It is expressly understood and agreed that should the Government modify this contract as herein provided for said change shall be at no change in the contract price.

(f) The Administrative Contracting Officer will forward the three copies of the data called for under paragraphs (a) and (b) above to:

Memphis Air Force Depot
Mallory Air Force Station
3300 Jackson Avenue
Memphis 2, Tennessee
ATTN: MPSJC

PART XXXVIII - QUALITY CONTROL SURVEILLANCE

(a) Quality Control Surveillance and preliminary inspection shall be performed at the plant(s) producing the supplies and services encompassing Item 1 and Item 2, Part I, hereto. Quality Control and preliminary inspection documentation shall be forwarded to the Administrative Contracting Officer, for expeditious transmittal to the Air Force Activity having the assigned responsibility for final inspection and acceptance.

(b) The place of final inspection and acceptance and F.O.B. Point of the articles and data to be furnished under this contract shall be as set forth in Part IX, hereto.

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PART XXXIX - DEFENSE SUBCONTRACTING SMALL BUSINESS PROGRAM

(a) The Contractor agrees to establish and conduct a program to afford small business concerns an equitable opportunity to compete for Defense subcontracts within their capabilities. In this connection, the Contractor shall - - -

(i) designate a small business liaison officer, who will (A) maintain liaison with duly authorized representatives of the Government on small business matters, (B) supervise compliance with the clause of this contract entitled "Utilization of Small Business Concerns" and (C) administer the Contractor's Small Business Program;

(ii) assure that small business concerns will have an equitable opportunity to compete for subcontracts, particularly by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate small business participation;

(iii) maintain records showing (A) whether each prospective subcontractor is a small business concern; and (B) procedures which have been adopted to comply with the policies set forth in this clause;

(iv) include the "Utilization of Small Business Concerns" clause in subcontracting opportunities; and

(v) submit such information on subcontracting to small business as is called for on forms duly authorized by the Department of Defense.

(b) A "small business concern" is a concern that

(i) is independently owned and operated, is not dominant in its field of operations and, with its affiliates, employs fewer than 500 employees;

(ii) is certified as a small business concern by the Small Business Administration.

(c) The Contractor further agrees to insert, in any subcontract hereunder which is in excess of $1,000,000 and which contains the clause entitled "Utilization of Small Business Concerns", provisions which shall conform substantially to the language of this clause, including this paragraph (c).

RFP 40 604-60-5386

PART XL - PRICE ANALYSIS

DD Form 633, entitled "Cost and Price Analysis" is attached herein, and shall be completed in detail and returned herewith.

PART XLI - PROPOSAL CONTENTS

This proposal consists of:

| | |
|---|---|
| DD Form 746 | Cover Sheet |
| DD Form 746 | Schedule Pages 1 thru 26 |
| Form MCP 71-163 | Pages 1 & 2 and Attachment No. 1. |
| Form MCP 71-53 | Page 1 - Item Identification & Container Marking |
| Form ASC 321B | Programming Check List |
| Form AMC 263 | Statement of Provisioning Policy |
| MCMSP Exhibit No. 1-10 | Technical Publication Requirements, Pages 1, 2 & 3. |
| MPM Exhibit No. 1 | Photographic Requirements for Plants. |
| MCP 71-77 | Engineering Data Requirements (June 59) Pages 1, 2, 3, 4 & Attachment A |
| Standard Form 32 | Oct 57 - Clauses 1 thru 21 |
| Form MCP 71-32(5) | November 59 - Clauses 22 thru 43(d) |
| Form MCP 71-613S | June 59 - Paro 9.13(s) Clause 44, Data |
| Form MCP 71-512 | May 59 - Clause 45, Progress Payments |
| Form MCP 71-591 | Oct 58 - Paro 9-4, Clause 46, Patent Rights, Pages 1 and 2. |
| Form MCP 71-597 | Jan 55 - Paro 9-11A.1, Clause 47, Patent Indemnity. |
| QPL-25959-2 | 26 Jan 1959, Qualified Products List. |

AF Bulletin Number 23 - current issue
Numerical List AF and AN Standard Drawings - CURRENT ISSUE

Mil Specs: MIL-G-27253A (USAF) dtd 8 March 1960.
MIL-S-8512B dtd 8 Jan 58 & Amend No. 1 dtd 4 Feb 59.
MIL-G-18997A (SHIPS) dtd 7 Aug 58 & Amend No. 2 dtd 20 Jan 59
MIL-T-25959A (USAF) dtd 24 Jul 58 & Amend No. 1 dtd 24 Aug 59 and Amend No. 2
MIL-T-25960A (USAF) dtd 24 Jul 58 & Amend No. 1 dtd 24 Aug 59
MIL-D-26715B (USAF) dtd 1 Jan 60

Fed Std No. 5a- dtd 19 May 58

Ordnance Dwgs: C8987830 "C" Size
C8987831 "C" Size
B8987832 "B" Size
B8987839 "B" Size
C8987855 "C" Size
C8987856 "C" Size

(Cont'd)

RFP 40-604-60-5386

Ordnance Dwgs: (Cont'd)

C8987857 "C" Size
C8987869 "C" Size
C8987870 "C" Size
C8987876 "C" Size
C8987877 "C" Size
C8987878 "C" Size
C8987888 "C" Size
C8987889 "C" Size
C8987890 "C" Size
C8987891 "C" Size

USAF Dwgs: 48B7796 with details on D/L
49A3818
49A3819
49A3820
49B6564 with details on D/L
52A3751
59C6671 with details on D/L
SAC Sketch 11-11-59 - revised 7 Dec 59

THE GOVERNMENT IS AUTHORIZED TO USE THESE DRAWINGS FOR PROCUREMENT PURPOSES.

## PRESERVATION, PACKAGING AND PACKING REQUIREMENTS

The requirements set forth on this form will supersede any conditions inconsistent herewith. All specifications and bulletins applicable to the requirements herein will be of the issue in effect on the date of the invitation for bids.

| PURCHASE REQUEST OR MIPR NO. | AF CLASS NO. OR FED SUP GROUP NO. |
|---|---|
| MP-60-3655-40820L | 2655 RFP 40-604-60-5386 |

1. LEVEL A. PRESERVATION AND INTERIOR PACKAGING SHALL BE AS INDICATED BELOW AND IN ACCORDANCE WITH THE GENERAL REQUIREMENTS OF PARAGRAPH 4A. THE FOLLOWING ITEMS SHALL BE PRESERVED AND PACKAGED IN ACCORDANCE WITH SPEC. MIL-P-116, METHODS AND UNIT QUANTITIES AS SHOWN: On Attachment No. 1 to this Form.

Items 1, 2, 4 and 7 are applicable.

A. FOLLOWING ITEMS SHALL BE PRESERVED, PACKAGED IN ACCORDANCE WITH

| SPECIFICATION | PARAGRAPH(S) OR LEVEL(S) | ITEM(S) |
|---|---|---|
| | | |

| SPECIFICATION | PARAGRAPH(S) OR LEVEL(S) | ITEM(S) |
|---|---|---|
| MIL-C-27253A (USAF) | Level "C" including var. 5.1 for Items 1 and 2, Part 1. | Units of items 1, 2, 4, and 7 shipped for immediate use at first destination. |

2. ANA-PT CARDS SHALL BE PROVIDED IN ACCORDANCE WITH PARAGRAPH OF ANA BULLETIN 392A. DRAWINGS SHALL BE PREPARED FOR ITEMS HAVING PHYSICAL CHARACTERISTICS WHICH REQUIRE SPECIAL BLOCKING, BRACING, CUSHIONING OR SUSPENSION SYSTEM OR SPECIALLY DESIGNED NON-SPECIFICATION CONTAINERS IN ACCORDANCE WITH THE REQUIREMENTS OF AMC FORM 163M, ATTACHED. ANA-PT CARDS, DRAWINGS AND TEST REPORTS SHALL BE FORWARDED TO:

3. PACKING AND SHIPPING CONTAINERS

A. EXPORT TYPE - LEVEL A - COMPLY WITH (*Complete applicable block(s)*)

| | PARAGRAPH(S) 4B(1) (2) (3) (4) (5) (6) (7) (10) | ITEMS |
|---|---|---|
| | SPECIFICATION | ITEMS |

B. DOMESTIC TYPE - LEVEL B - COMPLY WITH (*Complete applicable block(s)*)

| | PARAGRAPH(S) 4B(1) (2) (3) (4) (5) (6) (8) (10) | ITEMS |
|---|---|---|
| | SPECIFICATION | ITEMS |

C. IMMEDIATE USE - LEVEL C - COMPLY WITH (*Complete applicable block(s)*)

| | PARAGRAPH(S) 4B(1) (2) (3) (4) (5) (6) (9) | ITEMS |
|---|---|---|
| | SPECIFICATION | ITEMS |

D. AIR TYPE - COMPLY WITH

| | MIL-A-25175 | ITEMS |
|---|---|---|

| INITIATED BY | ORGANIZATION | DATE |
|---|---|---|
| J. W. Ahern | MPSQPA | 8 Dec 1959 |
| **APPROVED BY** | **ORGANIZATION** | **DATE** |
| R. F. CONNER /s/ J. W. Ahern | MPSQPA | 8 Dec 1959 |

MCP 71-163, Page 1 SEP 59 PRINTED CONTENTS HEREON ARE IDENTICAL TO THE FACE SIDE OF AMC FORM 163, SEP 59 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

**4. GENERAL REQUIREMENTS:**

A. Preservation and Interior Packaging: (Unless otherwise specified the following requirement shall apply.)

(1) Packaging material in direct contact with unprotected surfaces susceptible to damage by corrosion shall meet the requirements of Specifications MIL-B-121, MIL-B-130, MIL-A-148, MIL-P-4185 or the general requirements of Paragraph 3.5.1 of MIL-P-116 as applicable.

(2) Unless otherwise specified, interior packaging and interior containers shall meet the material requirements of Specification JAN-P-100. For domestic and air shipments, the waterproofing requirements are waived for folding cartons, setup boxes and for intermediate containers.

(3) Cushioning materials shall meet the requirements of specifications listed in USAF Specification Bulletin 56 (section headed, Cushioning Materials) as applicable. (Excelsior pads, when used, shall be in accordance with Type II, Class A, NN-E-911.)

(4) Test shall meet the requirements of MIL-P-116.

(5) Each unit package and/or intermediate container will consist of only identical items of the same stock number, cure date, manufacturing date, or expiration date (when applicable specifications, bulletins, or other documents require such dates to be indicated on the item or interior package).

(6) All bagged or wrapped items shall be packed within intermediate containers conforming to Specifications PPP-B-566, PPP-B-676 or MIL-B-4229 as applicable. Boxed items may be over-packed within intermediate containers.

B. Packing: (Unless otherwise specified, the following requirements shall apply.)

(1) Insofar as possible and practical exterior containers shall be uniform in shape and size, shall be of minimum cube and tare consistent with the protection required, and shall contain identical quantities of identical items.

(2) In no instance will Type 3 loads be packed in fiberboard containers, unless converted to a Type 1 or Type 2 load by adequate interior packaging. (See JAN-P-100 for definitions of load types.)

(3) At no time will the commingling of items designated Hi-Valu and non-Hi-Valu be permitted. This does not preclude the consolidation of Hi-Valu items in shipping containers.

(4) Only where impractical because of the limited quantities to be shipped, shall items of more than one property class, stock number, cure date, manufacture date or expiration date be packed in the same exterior shipping container. All identical stock numbered, cure dated, date of manufacture, or expiration dated items shall be segregated and packaged in a suitable interior (intermediate) container or overwrap. The exterior shipping container in three instances shall not exceed 40 inches in any one dimension.

(5) The gross weight of each exterior shipping container shall be limited as follows: approximately 200 pounds for export shipment, approximately 500 pounds for domestic shipment, except when these respective weights are exceeded by the weight of a single packed item or when the limitations of a container specification is less. Shipping containers with a gross weight of 300 pounds or over and 60 inches or more in length shall be provided with longitudinal skids, attached in such a manner and of sufficient size to permit the four-way entry of lifting devices. Rubbing strips may be added to longitudinal skids to facilitate handling of long, narrow containers.

(6) Unitised loads on 40 x 48 inch pallets, four-way entry, shall be used to the greatest extent practical and economical. When unitised loads are used, each pallet shall consist of like containers of same size. The contents of each pallet shall be consigned to a single consignee. Containers shall be palletized using a tie-in pattern or by interleaving with paper or fiberboard and securely anchored by strapping (flat or round steel) or filament tape, Specification PPP-T-97.

(7) Export-type exterior containers shall conform to Specifications PPP-B-575, PPP-B-585, PPP-B-591, PPP-B-601, PPP-B-621, PPP-B-636, MS 24483, JAN-P-104, MIL-C-132, MIL-B-138, MIL-C-3769, MIL-C-3774, MIL-C-5406, MIL-C-6057 or MIL-B-10377 as applicable. Closure and strapping shall be in accordance with the applicable container specification or appendix thereto. Tape conforming to Specification PPP-T-97 may be used in lieu of (round or flat) steel for fiberboard containers only. Plywood, if used, shall conform to Specification NN-P-515, Type II, Class 2, for all containers except when the contents consists of food, clothing or subsistence items; then Type II, Class 1, shall be used. When the container or packaging material immediately within the exterior container is not waterproof, a caseliner shall be provided. Sealed caseliners shall conform to the requirements of Specification MIL-L-10547 and appendix thereto or as an alternate, material meeting the requirements of Specification UU-P-271 or MIL-B-13239 may be used. The seams, joints and closure shall be equal to the waterproofness of the material itself. When adhesive material is used for sealing the joints and closure, the material shall conform to Specification MIL-A-140.

(8) Domestic-type exterior containers shall conform to Specifications PPP-B-575, PPP-B-585, PPP-B-591, PPP-B-601, PPP-B-621, PPP-B-636, MS 24483, MIL-C-132, MIL-B-138, MIL-C-3769, MIL-C-3774, MIL-C-4349, MIL-C-5406, MIL-C-6057, MIL-C-10377, MIL-C-11133, MIL-C-11456 or PPP-B-640 as applicable. Closures and strapping shall be in accordance with the applicable container specification or appendix thereto. Tape conforming to Specification PPP-T-97 may be used in lieu of (round or flat) steel for fiberboard containers only.

(9) Items destined for immediate use upon arrival prepared for domestic shipment, in packages which require overpacking for acceptance by the carrier, shall be packed in commercial exterior containers in conformance with the carriers tariffs to insure safe delivery at the lowest cost for packing and freight charges combined. Containers and closure shall meet: Rail consolidated or uniform freight classification rules and regulations and tariffs or other common carriers as applicable to the mode of transportation.

(10) Physical protection: Cushioning, blocking, bracing and bolting as required, shall be in accordance with Specification JAN-P-100, except that for domestic and air shipments, waterproofing requirements for cushioning material and containers shall be waived. Unless otherwise specified in the contract or the applicable commodity specification, rough handling tests of Specification JAN-P-100 shall apply. However, in instances where rough handling tests of Specification MIL-P-116 are applicable and required, such rough handling tests need not be duplicated and evaluation as to adequacy of MIL-P-116 accomplishments as well as effectiveness of cushioning, blocking, bracing and bolting as required may be simultaneously accomplished.

C. Carloading: If this contract provides for shipment by rail, of supplies being delivered to the Air Force or to an Air Force contractor for use in performance of an Air Force contract, the contractor shall observe as minimum requirements the methods for loading, blocking and bracing shipments in or on railroad cars as set forth in appropriate loading rules pamphlets of the Association of American Railroads, except that other methods in general use providing equivalent or superior protection may be substituted for recommendatory methods set forth in these pamphlets. Contractors will secure Loading Rules Pamphlets from the Secretary, Loading Rules Committee, Association of American Railroads, 60 East Van Buren Street, Chicago 5, Illinois. If the contractor desires to use carloading methods other than those prescribed by the Association of American Railroads which will provide adequate or superior protection, he will submit a full explanation of such methods to and receive approval from the contracting officer before shipment.

D. Subcontractors: The contractor is responsible for necessary action to see that requirements set forth in this form are complied with by his subcontractor where shipments are made direct to Government establishments.

ATTACHMENT NO. 1 TO MCP 71-163 FORM

P/R No: MP-60-3655-40820L RFP 40-604-60-5386

Items 4, 5 and 7. Requirements for preservation, packaging and packing shall be established as follows:

1. The Contractor will notify the Packaging Control Branch, Memphis AF Depot, through the cognizant Administrative Contracting Office, of suitable tentative date for convening of a Packaging Guidance Conference at this facility.

2. The Contractor will prepare a packaging data card for each item selected through provisioning action. Format, methods, quantity and distribution of packaging data cards required will be outlined during the Packaging Guidance Conference.

3. Subsequent to the Packaging Guidance Conference and Contractor's receipt of a definitized spare parts list, the Contractor will notify the Packaging Control Branch, Memphis Air Force Depot, that packaging data cards are available for review. Contractor will have entered his recommended preservation, packaging and packing on the packaging data card prior to review by the packaging group.

4. The Packaging Control Branch, Memphis Air Force Depot, is the responsible agency for review and approval of Contractor's recommended preservation, packaging and packing.

5. Contractor will make available for review by the packaging group sample parts of drawings of the items being procured. Review of packaging data cards will be accomplished at the Contractor's facility on a scheduled basis as determined by the Air Force and Contractor.

## ITEM IDENTIFICATION AND CONTAINER MARKING

Requirements set forth on this form shall apply to any contract issued thereon and supersede any condition inconsistent herewith. All standards, bulletins, and publications referenced herein shall be of the issue in effect on the date of the invitation for bids.

PURCHASE REQUEST NO. MP-60-3655-40820L Class 3655 RFP 40-604-60-5386

1. PHYSICAL ITEM MARKING
   - [X] A. Physical items shall be marked in accordance with Military Standard MIL-STD-130.
   - [X] B. Physical items shall be marked in accordance with MIL-P-514, MIL-G-27253 (USAF)

2. PACKAGE AND CONTAINER MARKING
   - A. Interior packages and shipping containers shall be marked in accordance with Military Standard MIL-STD-129.
     - (1) Specification number and manufacturer's part number shall be included in the identification markings when such data exists.
     - (2) On multiple item contracts, the contract item number as shown on DD Form 250 shall be included in the contract data markings on interior packages only when the shipping container has more than one line item. When the shipping container has only one line item, the item number shall be placed on the shipping container only.
   - B. Tags and labels, when required, shall be approved contractor's tags or labels conforming to the requirements of Military Standard MIL-STD-129. Contractor's forms which indicate serviceable condition shall not be any shade of red or green. Tags or labels may be used on metal containers unless otherwise specified by the procuring activity.
   - C. Interior packages and shipping containers for items designated in the contract or purchase order as HI-VALU items shall be conspicuously identified with the Air Force HI-VALU adhesive tape insignia, metal or plastic tag, as furnished by the office assigned administration of the contract. The tape shall be placed on opposite ends of packages, cartons, etc. to insure lap-over on each side of the package. When HI-VALU metal or plastic insignia are used, four (4) tags will be attached to the container to obtain the same type of identification. The insignia will be placed on the same side, end or location as required for identification markings in Military Standard MIL-STD-129, and shall be located so as not to interfere with other authorized markings.

3. PRECAUTIONARY MARKING
   All special coated temeplate containers shall be marked with the legend "CAUTION—Do not reuse as food container."

4. REINSPECTION REQUIREMENTS
   - A. Items listed in the applicable 00-20K series Technical Orders, or as indicated hereafter, shall have reinspection data applied as specified, except those items which have the storage period prefixed by a single dagger (†) or three asterisks (***). Items which have the storage period prefixed by a single dagger shall be marked as specified in ANA Bulletin 438. Items which have the storage period prefixed by three asterisks shall be marked as specified in ANA Bulletin 438, or the specification for the item if not listed in ANA Bulletin 438.
   - B. Interior packages and shipping containers containing identical items shall bear a legend essentially as follows: "REINSPECTION DATE _____." Unpacked items shall have an approved tag or label containing essentially the same legend, securely affixed thereto.
   - C. The date, computed from the date of packaging, shall be entered in the legend indicated in paragraph 4B. This date shall be determined by adding the number of months indicated as "ALLOWABLE STORAGE LIFE" for the respective items, to the date of packaging.

| ITEM NOS. | ALLOWABLE STORAGE LIFE WITHOUT REINSPECTION PRIOR TO ISSUE FOR SHIPMENT (Months) |
|---|---|
| | |

| INITIATED BY | ORGANIZATION | DATE |
|---|---|---|
| L. Blount | MPSJEP | 7 Dec 1959 |
| **APPROVED BY** | **ORGANIZATION** | **DATE** |
| H. E. MOUNT | MPSJEP | 7 Dec 1959 |

WCP 71-59 SEP 59

REPLACES AMC FORM 103C, JUL 57, WHICH IS OBSOLETE

Printed contents hereon are identical to AMC Form 53, Sep 59

**PROGRAMMING CHECK LIST** (Automotive Equipment)
To provide data governing initial provisioning of spare parts

| ORG CODE OF INITIATOR | DATE OF INITIATION | REVISION NUMBER | DATE OF REVISION |
|---|---|---|---|
| MPSLL | Dec 3, 1959 | | |

| TYPE OF EQUIPMENT | QUANTITY | FY PROGRAM |
|---|---|---|
| A/E26A-8 1 1/2 Ton LOX Plants $LO_2$& $LN_2$ | 20/70 | 60 |

| PR/MIPR NO. | DATE | CONTRACT NO. | DATE |
|---|---|---|---|
| MP-60-3655-40820L | 3 Dec 59 | | |

NAME AND LOCATION OF CONTRACTOR

1. In order for the Contractor to comply with Revised MCP 71-673 [illegible] 71-650, [illegible], and respective amendments thereto, and forecast spares, and ground support equipment, the data detailed below are being furnished for use with the initial procurement instrument (PR, MIPR, and Letter Contract, etc.). The Contractual Provisioning Document(s) (MCP 71-Series) indicated below is/are to be included as the provisioning document(s) that will govern the selection of initial support requirements.

| | AMENDMENTS/ADDENDUMS | | AMENDMENTS/ADDENDUMS |
|---|---|---|---|
| MCP 71-MK 673 | | MCP 71-650 | |
| DATE | | DATE | |
| MCP 71-649 FOLLOW-ON | | MCP 71-650 FOLLOW-ON | |
| DATE | | DATE | |
| MCP 71-666 | | MCP 71-669 | |
| DATE | | DATE | |
| MCP 71-666A | | | |
| DATE | | | |

2. ASSIGNMENT OF END ARTICLE

| NO. OF CONUS BASES | NO. OF OS BASES |
|---|---|
| | |

3. RECEIVING COMMANDS FOR OPERATIONAL PROGRAM

4. TEST PROGRAM

| NO. OF END ARTICLE ASSIGNED | TEST SITES | UTILIZATION TEST PERIOD FROM (MO & YR) | UTILIZATION TEST PERIOD TO (MO & YR) |
|---|---|---|---|
| | | | |

5. OPERATIONAL PROGRAM

| QUANTITY PROCURED | QTY FOR ORG REQUIREMENTS | QTY FOR REPL REQUIREMENTS | QTY FOR MOB RES RQR |
|---|---|---|---|
| 20/70 | 20/70 | 0 | 0 |

6. PROVISIONING FACTORS/UTILIZATION

| AVG MO UTIL RATE | END ART LIFE EXPECTANCY | OPR SPARE PARTS AND COMP FOR TABLE VI RQR TO SUPPORT | MONTHS INITIAL SUPPORT ARTICLES FOR 360 DAYS |
|---|---|---|---|
| 560 Hours | 10 Years | | |

7. END ARTICLE REPAIR AND OVERHAUL POLICY

MAJOR OVERHAUL OR IRAN

| DEPOT YES | DEPOT NO | IF YES COMPLETE THE FOLLOWING: NO. OF CONUS DEPOTS | IF YES COMPLETE THE FOLLOWING: NO. OF OS DEPOTS | CONTRACTOR YES | CONTRACTOR NO | NO. OF FACILITIES |
|---|---|---|---|---|---|---|
| X | | | | | | |

BASE OVERHAUL: ☐ YES ☒ NO ORG AND FIELD MAINTENANCE: ☒ YES ☐ NO

8. ENGINES

| TYPE OF ENGINE A | MANUFACTURER B | NO. OF ENGINE INSTALLATIONS C | NO. OF SPARE ENGINES D | TOTAL OPR HOURS E | TIME BETWEEN OVERHAULS F | NO. OF OVHL G |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

9. SOURCE DATA DOCUMENTS (REFERENCE ITEM NO. FOR EACH LISTING) — DATED

10. ADDITIONAL INFORMATION (CONTINUE ON BLANK OFFSET MASTER IF NECESSARY)

AMC FORM 25 JUL 56 321B

## STATEMENT OF PROVISIONING POLICY - INITIAL PROVISIONING OF SPARE PARTS

| AMA/AFD AND ORG CODE OF INITIATOR | DATE OF INITIATION (Basic) | REVISION NUMBER | DATE OF REVISION |
|---|---|---|---|
| MPSLLL | 3 Dec 59 | | |

| PR/MIPR NO. | DATE | CONTRACT NO. | DATE |
|---|---|---|---|
| MP-60-3655-40820L | 3 Dec 59 | | |

NAME AND LOCATION OF CONTRACTOR

| TMS OF END ARTICLE | NAME OF END ARTICLE | QUANTITY | FY PROGRAM |
|---|---|---|---|
| | Generating Charging Plant 1 1/2 T/D | 70 | 60 |

1. General:

a. This Statement of Provisioning Policy is furnished to permit the contractor to plan and execute the provisions and requirements of MCP 71-673 as it pertains to interim release of spare parts, various types of meetings, provisioning technical documentation, etc.

b. Official changes to the data contained within this form will be submitted by Memphis AFD, (MPSLLL). Copies of such revisions will be furnished as revisions to basic AMC Form 263, to the contractor, through the administrative contracting officer (ACO), with an information copy to the procuring contracting officer (PCO).

c. All items indicated by "X" in the block provided in the left margin of this form pertain to the procurement instruments listed above.

d. New or additional provisioning requirements which are not specifically required by MCP 71-673 will not be included in, or attached to, this Statement of Provisioning Policy.

2. Correspondence:

a. All correspondence, provisioning documentation, data, etc., pertaining to spare parts for the end article being procured on the above mentioned procurement, will be addressed to Memphis AF Depot Attn: MPSLLL - Bill Brown

b. In no case will the contractor correspond directly with any AMA/AFD on matters pertaining to initial provisioning, other than listed in paragraph 2.a. above, unless specifically authorized by the Provisioning Control Component.

c. To the extent that the contractor has the capability, all provisioning documentation and reports required by MCP 71-673 will be prepared by EAM or EDPE methods. When so prepared, corresponding decks of EAM cards or EDPE tapes (will be) (will not be) furnished to Memphis AFD, Attn: MPSLLL Bill Brown

3. Combined Hi-Valu/Guidance Meeting. Part II, Paragraphs 1. and 3.

☐ a. A combined Hi-Valu/Guidance Meeting is required by the AF. Within 30 days after receipt of this Statement of Provisioning Policy, the contractor shall recommend to..... Attn:..... the date and place of the meeting. The recommended date of the meeting shall be not less than 30 days from the date on which the contractor submits his recommendation. The LSM or End Article Prime Depot shall fix a date for the meeting within 15 days subsequent to the date recommended by the contractor.

☐ b. If the contractor desires a combined Hi-Valu/Guidance Meeting, the agenda, proposed date, and location of the meeting must be submitted to.....Attn:.....

4. Production Lists. Part II, Paragraph 2.b.

☒ a. .....20.....copies of Production Lists, covering long lead time items interim released, or items, including bulk items, recommended by the contractor, will be furnished to the destinations listed in Exhibit "A," attached. Production Lists shall be prepared in the format of Figure "A" and will be segregated by the contractor in the manner indicated in Part II, Paragraph 2 of MCP 71-673.

☒ b. Two copies of drawings, sketches, or other available technical data relating to items released or recommended, will accompany Production Lists, with the exception of items to which Federal Stock Numbers have been assigned, and AN, JAN, MS, USAF, NAF, and MIL drawings.

☒ c. Item numbers shall be assigned by the contractor in accordance with Part II, Paragraph 2.c. of MCP 71-673.

☒ d. All Class Codes, Federal Stock Numbers, Expendability Codes, Source Codes, and Quantity of Unit Pack available to the contractor from previous contracts should be included on Production Lists and other Provisioning Technical Documentation prior to submission.

5. Advance Provisioning Documentation. Part III, Paragraphs 1.a. through 1.a.(5). (NOTE: Specify either Option "A" or "B," but not both).

☐ a. Option A. At least 30 days prior to the date established for the Source Coding Meeting, the contractor shall furnish ..... copies of (i) Preliminary Group Assembly Parts List of the Illustrated Parts Breakdown (less illustrations) prepared in accordance with Specification MIL-B-5006 and (ii) 100% Numerical Listing (preliminary index of IPB) of all parts (exclusive of bulk item type material) used in the production of the end article, prepared in the format of Figure "A." Destinations are listed in Exhibit "A" attached.

[X] b. Option 2: At least 90 days prior to the date established for the Source Coding Meeting, the contractor shall furnish 2 copies of (i) Preliminary Group Assembly Parts List of the Illustrated Parts Breakdown (less illustrations) prepared in accordance with Specification MIL-B-5008 and listed on the format of Figure "A," and (ii) Balance Listing of Non Group Assembly Parts List Items (straight line listing) of all remaining parts (exclusive of bulk item type material) used in the production of the end article, prepared in the format of Figure "A." Destinations are listed on Exhibit "A" attached.

[X] c. 2 additional copies of the documentation specified in paragraphs 5.a. or 5.b. above will be required at the Source Coding Meeting.

6. Breakdown for Recoverable Type Items. Part III, Paragraph 1.a.(3).

[ ] a. The contractor for Recoverable Type Items shall furnish Memphis AFB (Depot)
Attn: MCSLLL a reproducible copy of the following documents, (i) within 60 days after receipt of request from the Government, but not later than 30 days prior to the Source Coding Meeting, or (ii) 60 days after completion of engineering design, whichever is first:

[ ] (1) All inclusive breakdown(s) of the specified item(s) prepared on the format of Figure "A," or

[X] (2) Preliminary Group Assembly Parts List(s) of the specified item(s) prepared in accordance with Specification MIL-B-5008, but listed on the format of Figure "A," plus a 100% numerical index for the item(s).

[X] b. Two complete sets of drawings or sketches, other than Federal Stock Numbered items and AN, JAN, MS, USAF, NAF, and MIL items, will be furnished with each such breakdown.

[X] c. For recoverable type items, direct contact with the prime contractor's vendors/sub-contractors by applicable CCM's is desired for the purposes of review, familiarization, and coordination on the selection of maintenance and overhaul parts and related support equipment for such items as prescribed in Part III, paragraph 1.a.(3).(a).

7. List of Vendor Recoverable Type Items. Part III, Paragraph 1.a.(4)

[X] a. At least 90 days prior to the Source Coding Meeting, the contractor will furnish 20 copies of List of Vendor Recoverable Type Items, covering vendor items or altered vendor items having application to the end article, submitted in accordance with format of Figure "A." Destinations are listed in Exhibit "A" attached. These items previously submitted on Production Lists or presented at the Combined Hi-Valu/Guidance Meeting, and bulk type items or material, need not be listed.

[X] b. Two copies of applicable drawings or sketches, other than Federal Stock Number items and AN, JAN, MS, USAF, NAF, and MIL items, will accompany such list.

8. Bulk Items List (or Bill of Materials if Contractually required). Part III, Paragraph 1.a.(5)

[X] a. 5 copies will be required, prepared on format of Figure "A" (Bulk Items List only) at least 30 days prior to the Source Coding Meeting to the destinations indicated in Exhibit "A," attached.

[X] b. 2 copies will be required at the Source Coding Meeting, in addition to the copies listed in paragraph 8.a. above.

[X] c. 2 copies of revised pages showing significant additions or deletions to the items or quantities will be required at intervals not greater than 120 days, until completion on the contract, at the destinations indicated in Exhibit "A," attached.

9. Drawings. Part III, Paragraph 1.b.

[X] a. The contractor shall have available, for use at the Source Coding Meeting, a complete set of current drawings, including all engineering drawings and vendor drawings for all items appearing in the Provisioning Technical Documentation.

10. Sample Articles. Part III, Paragraph 1.c.

[X] a. Sample articles and/or breakdown displays will be required and shall be available at the time of the Source Coding Meeting for:

[ ] (1) Those items designated by AMC on approved Production Lists or at the Combined Hi-Valu/Guidance Meeting.

[X] (2) For end article included on above referenced procurement instrument, i.e. PR, Contract, (letter or definitive), etc.

[ ] b. Sample article may consist of a production article made available to the Source Coding team for study and disassembly. The disassembly should be accomplished only to the extent required to show mechanical, functional, or physical relationship of parts to assembled unit.

[X] c. Exploded views of more complex vendor assemblies are very useful to the Source Coding team, therefore, if available, contractor should take action to obtain exploded views from the vendor.

11. Source Coding Meeting. Part III, Paragraph 2.

[X] a. A Source Coding Meeting will be required. The contractor shall advise Memphis AFB, Memphis, Tennessee Attn: MCSLLL the approximate date Provisioning Technical Documentation and sufficient drawings, sketches, and technical data will be available to accomplish Source Coding.

12. Documentation After Source Coding. Part III, Paragraphs 2.c., and 2.d.; Part IV, Paragraphs 1 and 2.

[ ] a. Summary Listing. Part III, Paragraph 2.c.

[ ] (1) copies of Summary List, prepared on format of Figure "A" covering all items and quantities approved for procurement, except new items Source Coded in the "P" Series as a result of the Source Coding Meeting, are required at the destinations listed in Exhibit "A," attached. The Summary Listing shall be furnished immediately following the completion of the Source Coding Meeting, but in no event later than 45 days thereafter.

☒ b. Within 10 days after completion of the Source Coding Meeting, the contractor shall submit Production Lists covering new items Source Coded in the "P" Series which were not previously recommended or released by the contractor prior to the Source Coding Meeting.

NOTE: For number of copies and destinations refer to paragraph 4.a. above.

☒ c. Two copies of each drawing or sketch for other than Federal Stock Numbered items, AN, JAN, MS, USAF, NAF, and MIL items will accompany such lists.

13. Pricing. Part IV, Paragraphs 1. and 2.

☒ a. 20 copies of the Priced Spare Parts List, prepared in the format of Figure "A," shall be submitted by the contractor not later than 60 days prior to the first scheduled delivery of spare parts. Destinations are indicated in Exhibit "A," attached.

☒ b. 20 copies of revised pages to the Priced Spare Parts List, prepared in the format of Figure "A," shall be submitted by the contractor at intervals not to exceed 60 days, until such time as the list has been established as the Spare Parts Exhibit by amendment to the contract. Destinations are as indicated in Exhibit "A," attached.

14. Revisions. Part V, Paragraphs 1.b.(1), 1.b.(2), 3.a. and Part IX, Paragraph 2.

a. Design Change Documentation.

☐ (1) Option A. Not later than 21 days after release of the engineering change, the contractor shall furnish ..... copies of Design Change Notices (DCN) prepared in the format of Figure "C," accompanied by two copies of all applicable drawings or sketches for other than Federal Stock Numbered items, AN, JAN, MS and NAS items. Destinations are indicated in Exhibit "A," attached.

☐ (a) The current approved mechanized DCN procedure may be used in lieu of the manual DCN.

☒ (2) Option B. Within 90 days from the date of AF approval of any design change or within 15 days from the date of publication of such change, whichever is earlier, the contractor shall furnish 20 copies of an Analysis of Spare Parts Change (ASPC) on a form substantially similar to Figure "G," accompanied by two copies of each new or changed drawing or sketch for other than Federal Stock Numbered items, AN, JAN, MS, and NAS items.

☐ b. ..... copies of a Straight Line Listing covering those items effected by design changes, which are neither procured, nor recommended for procurement, nor previously assigned a source code, nor considered to be of maintenance significance and two copies of all applicable drawings or sketches for other than Federal Stock Numbered items, AN, JAN, MS, USAF, NAF, and MIL items will be submitted by the contractor, as indicated below, for assignment of source codes and return to the contractor for inclusion in Part III of the IPB. Destinations are indicated in Exhibit "A," attached.

☒ (1) Concurrently with the spare parts DCN or Analysis of Spare Parts Change, or

☐ (2) At intervals not to exceed 60 days.

☒ c. The contractor will furnish, in writing, to the Administrative Contracting Officer, a notification of impending Spare Parts completion at least 150 days prior to the scheduled acceptance of the last article under contract.

15. Delivery of Spare Parts. Part VI, Paragraphs 1.a., 1.b., 1.c., and 2.

☒ a. Concurrent Delivery. Not later than 60 days before delivery of the first end article, the contractor shall furnish to the ACO

☐ (1) A line item delivery schedule for all items.

☒ (2) The concurrent delivery formula for the contract.

☒ b. Scheduled Delivery. Not later than 60 days before delivery of the first end article, the contractor shall furnish to the ACO a proposed line item delivery schedule for all spare parts to be delivered under the contract.

☐ c. A due-in-asset report is a requirement of the contract, therefore the provisions of paragraphs 15.a. or 15.b., above, as applicable, which require a line item delivery schedule do not apply.

☒ d. Bulk Shipment. Spare parts, including vendor maintenance and overhaul parts (except as limited in Part VI, Paragraph 1.c. of MCP 71-673), having a unit cost of less than $10.00 will be delivered in the fewest possible number of shipments.

☐ e. Pre-concurrent Delivery. The contractor shall not deliver spare parts more than 30 days before delivery of the first end article or the date of scheduled delivery, unless such delivery is approved by the AF.

NOTE: Authority to implement a 90 day pre-concurrent delivery procedure, is limited to contracts for new aircraft and missiles only and in no way is to be interpreted as applying to other commodity areas or to follow-on production contracts.

16. Government Furnished Property or Aeronautical Equipment. Part VI, Paragraph 3.

☐ a. When GFP or GFAE is required by the contractor for incorporation in spare parts, the contractor shall advise ..... Attn: ..... through the ACO, as soon as possible of the required items and quantities of GFP or GFAE, the delivery schedule necessary to meet required delivery of spare parts, and shipping and marking instructions.

17. Shipping Instructions. Part VI, Paragraph 4.

☒ a. The end article prime depot or LSM shall notify the contractor in writing, through the ACO, as to the destinations of spare parts to be furnished at least 120 days in advance of scheduled delivery.

18. Thirty Day Spare Parts Delinquency Report. Part VII, Paragraph 1.

☐ a. The contractor shall submit, through the ACO, 10 copies of the "Thirty Day Delinquency Report" in the format of Figure "E," to the destinations indicated in Exhibit "A," attached. If the contractor has the capability of furnishing a spare parts delivery report which is acceptable to Memphis AF Depot, Attn: MPSLLL in lieu of this report, the requirement for the "Thirty Day Delinquency Report" will be waived. Destinations are indicated in Exhibit "A," attached.

19. Funding Data. Part VIII, Paragraphs 1. through 1.d.

☒ a. Periodically, upon specific request of the ACO, but in no event more frequently than each 30 day period, the contractor shall furnish Memphis AF Depot Attn: MPSLLL funding data against each item of the contract covered by this document.

20. Hi-Valu Item Application Summary. Part IX, Paragraphs 1. and 2.

☐ a. The contractor will prepare, in complete detail in accordance with Specification MIL-H-8729, and submit two copies of the Hi-Valu Item Application Summary, or applicable form, for each functional item of spare parts specifically designated a Hi-Valu Item by Hi-Valu Review Board action, to the destinations indicated in Exhibit "A," attached.

21. Responsive Production Inventory. Part X, Paragraph 2.

☐ a. The contractor shall furnish Attn: through the ACO, a reproducible and 10 copies of the budget price and lead time relationship in phased sequence of manufacturing operation charts in accordance with the format of Figure "F," for those Hi-Valu items so specified at the Hi-Valu Review Board Meeting.

22. Test Support Table. Part XII, Paragraph 1.

☐ a. The contractor shall prepare and submit Supply Test Support Table in accordance with Specification MIL-S-26720 (USAF).

23. Support Package.

☒ a. The contractor will prepare and submit SOS Package(s) as outlined in Specification MIL-S-9387 (USAF).

☐ b. The contractor will prepare and submit SPS Package(s) for GSE as outlined in Specification MIL-S-9387 (USAF).

24. Quantity per Unit Pack.

☒ a. QUP for all procured items will normally be established during the review of Production Lists and in no case later than the Source Coding Meeting.

25. Preparation of Provisioning Lists (Incl 1 to MCP 71-673).

☒ a. Detailed instructions for insertion of data on the Provisioning List format (Figure "A"), in the blocks specifically provided for optional or varying use (block 3 (for other than electronic end articles), blocks 21 and 22) as recommended by the requiring activity, will be formulated at the time of the Combined Hi-Valu/Guidance Meeting and will subsequently be incorporated as Exhibit "B" to this form.

☐ b. Detailed instructions for insertion of data on Provisioning List format (Figure "A") in blocks of optional or varying use (block 3 (for other than electronic end articles), blocks 21 and 22) are attached hereto as Exhibit "B."

c. The contract control number to be inserted in card columns 2-7 in accordance with paragraph B.1.b.(2) of Incl 1 to MCP 71-673.

☐ (1) (Insert Number).

☒ (2) Will not be used.

d. The information to be inserted in block 18, within the limitations of paragraph B.18. of Incl 1 to MCP 71-673, is as follows: Contractor recommended overhaul qty.

e. The information to be inserted in block 19, within the limitations of paragraph B.19. of Incl 1 to MCP 71-673, is as follows:

26. Repair Kits. Part III, Paragraph 1.a.(3) and Incl 3 to MCP 71-673.

☒ a. The Repair Kit concept will be applied to those recoverable type items as recommended by the contractor and selected by the Government.

27. Special Remarks:

28. Attachments: Exhibit ☐ A ☐ B ☐ C applicable and attached.

AMC FORM REV 60 263

EXHIBIT "A" – PROVISIONING DOCUMENT DISTRIBUTION CHART

| NAME AND ADDRESS OF AMA/APD | |
|---|---|
| PRODUCTION LISTS | |
| OPTION "A" PRELIMINARY GP ASSY PARTS LIST OF IPB PLUS 100% NUMERICAL LISTING | |
| OPTION "B" PRELIMINARY GP ASSY PARTS LIST OF IPB PLUS BAL LISTING OF NON-GROUP ASSY PARTS LIST | X |
| BREAKDOWN OF RECOVERABLE TYPE ITEM | |
| LIST OF VENDOR RECOVERABLE TYPE ITEM | |
| BULK ITEM LIST | X |
| SUMMARY LISTING | |
| PRICED SPARE PARTS LIST | X |
| OPTION "A" DESIGN CHANGE NOTICE | |
| OPTION "B" ANALYSIS SPARE PARTS CHANGE | X |
| DESIGN CHANGE STRAIGHT LINE LISTING | X |
| THIRTY DAY REPORT DELINQUENCY | X |
| HI-VALU ITEM APPLICATION SUMMARY | |

AMC FORM 323

PAGE 5 OF 9 PAGES

MCM-8 EXHIBIT NO. 1-10

## Technical Publication Requirements for Shop Machinery Ground Servicing and Handling Equipment

**1. Publications.**

a. The publications listed below will be furnished to the Air Force in support of the equipment being procured under this contract. Contractor's recommendations, if applicable, concerning (1) any additional technical data coverage considered necessary and (2) suggested changes to these technical publication requirements will be given due consideration for possible incorporation herein: See Page 3

| Title or Type | New Basic | Reissue of T.O. | * Specification | ** Revision to T.O. |
|---|---|---|---|---|
| (1) Operation and Service Instructions or Operation, Service and Repair Instructions | X | | MIL-H-7940 | |
| | | | MIL-H-6361 | |
| (2) Overhaul Instructions | X | | MIL-H-7991 | |
| (3) Illustrated Parts Breakdown | X | | *** MIL-B-8005 | |
| (4) Time Compliance Technical Orders | | | MIL-T-7879 | |

* Only the basic numbers of specifications are listed; however, the latest issue of specifications in effect at the time of submittal of contractor's proposal will apply. This will also apply to any other specifications referenced in this exhibit.

** The technical content and format of revisions will be prepared in accordance with the same specifications utilized for preparation of the basic handbooks.

*** Stock Numbers.—All available stock numbers shall be listed in the Numerical Index of the Illustrated Parts Breakdown, whether furnished to the contractor in other government publications, for provisioning, marking, shipping or other purposes. When the contractor has received the stock numbers from the procuring activity before the cutoff date of a basic publication, these stock numbers shall be included in the Numerical Index before the basic Illustrated Parts Breakdown is accepted. Stock numbers, or changes to stock numbers, received by the contractor (for any purpose) after the cutoff date for the basic publication, or after the cutoff date for any revision, shall be included in the first revision issued after such cutoff date before acceptance of the revision.

Decals.—Decals are to be considered as parts. The identifying drawing number for each decal shall appear in the Part Number column. The nomenclature or title of each decal shall appear in the Description column. Decals should be illustrated but a separate readable illustration of each decal is not necessary. Showing the location of the decal is adequate.

**2. Revisions.** In addition to the original material required to provide adequate instructions for the support of the equipment being procured, the contractor will furnish necessary revisions and reissues thereof to keep such publications up-to-date throughout the life of this contract. Revisions or reissues shall be submitted to correct any existing errors and expand and improve on data coverage wherever necessary to include information developed as a result of experience gained through utilization of equipment, URs, etc. Revisions and/or reissues shall also be submitted to provide instructions and data to reflect design, production or modification changes. (This applies to all publications being furnished.) The cost of such revisions or reissues, being undeterminable at the start of the contract, will be negotiated as they are required, either as a part of the Engineering Change Proposal covering the change or as otherwise agreed upon. Contractor will prepare revision and/or reissue material in accordance with the same style and format as the basic publications unless mutually agreed otherwise.

*See page 3 Paragraph 2A

**3. General Requirements.**

a. The material required herein which is to include applicable printer's assembly sheets and title and "A" pages, will be supplied in the form of negatives made in accordance with Specification MIL-N-4350, from reproducible copy prepared in accordance with Specifications MIL-H-5474 and MIL-H-4410.

b. If applicable equipment publication numbers are not furnished to the contractor within 30 days after issuance of the contract, contractor will submit a formal request to the AFPR for these numbers.

c. Upon completion of this contract, the complete current set of reproducible copy from which the above negatives were made will be delivered to the Government upon request. Only unscreened glossy prints of the original art work need be submitted.

d. The contractor will be required to continuously review all general and specific existing and future miscellaneous and time compliance technical orders to determine applicability to the equipment herein procured. The purpose of this review is to insure that all affected handbooks and illustrated parts breakdowns are revised to (1) reflect the information and changes in these technical orders and (2) delete all obsolete information. Revisions required as the result of this review will be furnished within 90 days after receipt of such technical orders.

e. Where classified instructions will comprise approximately 10% or less of a total handbook, and will be concentrated in one portion of the handbook, such instructions will be prepared separately in the form of a supplement to that handbook in order that the handbook proper may be unclassified. The format and content of such instructions shall be the same as if the instructions were prepared for inclusion in the handbook proper. There shall be an introduction in the supplement saying in effect that "This is a supplement to the ..... handbook, T. O. ....., prepared in order that that handbook may be unclassified." The introduction shall then proceed to establish the relationship between the supplement and the handbook, and give any other relevant information of assistance in the use of the supplement. In such instances, technical publication numbers for these supplements will be provided in the same manner as prescribed in paragraph 3.b. of this exhibit.

f. Concerning handbook data questions, the contractor shall be governed by AMCR 11-9.

4. Delivery Requirements.

a. Publications are required to be available concurrently with delivery of the equipment to using organizations. Accordingly, negatives of basic publications (including printer's assembly sheets and title and "A" pages) will be submitted to the appropriate Air Force office not later than 30 days prior to delivery of the first equipment for [illegible] with the following exception:

Negatives of Time Compliance Technical Orders will be delivered not earlier than 25 days and not later than 10 days prior to release of the first kit by the contractor to the Government. The latter delivery date must be met so that release of kits is not delayed because of the nonavailability of copies of technical orders for packing with each kit.

b. Revisions will be submitted as follows:

(1) Major Revisions: 30 days before delivery of the first production equipment item affected.

(2) Minor Revisions: At 90 day intervals or oftener if deemed necessary by the contractor or AMC.

NOTE: After each 90 day reporting interval, contractor will submit a certifying letter stating that revisions furnished adequately cover the equipment produced.

(3) Last Revision: Upon submittal of the final revision after production is completed, the contractor will certify in his letter of transmittal that this is the last revision and that all data submitted completely cover the equipment produced.

(4) No Revision: When no revisions are initially required, the contractor will certify by letter to the appropriate Air Force production office 30 days before delivery of the first item of equipment that the existing publications cover the equipment to be manufactured. After each 90 day period that follows, if revisions are still not required, additional certifying letters will be submitted to the Air Force production office. If no revisions are ever required, a final letter will state, "Production completed, revisions not required, existing publications completely cover the equipment." This letter will be addressed to the Contracting Officer with copies to (1) the Finance Office, (2) appropriate Air Force production office and (3) Maintenance Engineering-Technical Data office at the prime Maintenance AMA, and will be submitted at the time the contractor submits his invoice for final payment hereunder.

5. Pack-Up Data Requirements. If official technical order publications covering the equipment being procured on this contract have been printed and distributed, pack-up data will not be required; otherwise, preliminary data as defined in AMCR 8-21, will be packed with these articles until printing and distribution of official technical order publications have been accomplished. Thereafter, no data, either preliminary or official, will be packed with the articles.

6. Engineering Changes. Engineering Change Proposals will be submitted in accordance with ANA Bulletin 391.

7. Time Compliance Technical Orders. Time compliance technical orders will be furnished whenever requested by AMC and will be prepared in accordance with the current issue of Specification MIL-T-7878 in effect at the time requests therefor are received. Normally, requests for preparation and costs of such technical orders will be incorporated into the contract by the contractual instruments approving the Engineering Change Proposals.

8. Inspection, Acceptance and Delivery. The publications required herein shall be inspected, accepted and delivered in accordance with applicable provisions of AMC Regulation 8-12, instructions of appropriate APD or AFPR. At the time the Illustrated Parts Breakdown is submitted for inspection and acceptance, the Contractor shall certify by letter to the appropriate Air Force production office that the publication is in conformance with the final approved Provisioning Parts Breakdown as related to Air Force and Federal stock numbers, source coding and manufacturer's part numbers.

9. The Contractor shall furnish a full-scale reproducible of each decal, film marking and broad application marking in following quantities: a. One (1) set of reproducibles of prime contractors own design and b. Two (2) sets of vendor's reproducibles. These shall be delivered to Commander, Memphis Air Force Depot, ATTN: Chief, Administrative Services, 3300 Jackson Ave., Memphis, Tennessee, not later than 30 days prior to delivery of the first end article under contract.

Paragraph 1.a. (contd)

NOTE: Technical Publication Requirements should not be confused with Engineering Data Requirements.

Paragraph 2A.

Reproducible full scale film positives (prepared in general accordance with Specification MIL-N-4350) from which decals and vinyl film markings can be reproduced will be provided. One set of film positives of the Contractor's own decals and vinyl film markings and two sets of film positives of all vendor's decals and vinyl film markings are required. Parts are marked in accordance with MIL-STD-129. Accordingly, part numbers will appear on decals and vinyl film markings so that printed markings can be identified and requisitioned. Part numbers will appear on each film positive so that the number will reproduce on the face of the printed marking. The part number will be of sufficient size to be easily readable. It will be placed in any convenient but inconspicuous spot on the marking in such a manner that it will not detract from the information on the marking.

Paragraph 4 (contd)

c. If the specification to which the equipment is manufactured contains a paragraph requiring the preparation (and packing with each item of equipment) of installation or operation instruction, etc., such a requirement shall be considered not applicable because the Technical Publication Requirement contained herein are the only such requirements that shall be applicable to this procurement.

10. Intended use of these data is to provide operational and maintenance support of equipment called for by this contract.

This exhibit attached to PR No. MP-60-3655-40820L on 7 Dec 1959

BY: Wm. Louie Cole Tel: GLendale 8-4411, Ext 538

MPM EXHIBIT NO. 1

PHOTOGRAPH REQUIREMENTS FOR PLANTS

1. The Contractor for the equipment listed herein shall furnish one complete set of negatives and four complete sets of 8 x 10 inch glossy print photographs of each type of plant furnished as a result of this procurement document.

2. Each set shall consist of four views as follows:

   a. Front right or left side 3/4 view.
   b. Full side view.
   c. Full front view.
   d. Full rear view.

3. Background of photographs should be void of unrelated objects.

4. Plant nomenclature, Air Force or Federal stock number, manufacturer's name, PR or MIPR number and contract number shall appear on front side, bottom center of each glossy print photograph and negative.

5. Negatives and three complete sets of photographs shall be forwarded to:

   Commander
   Memphis Air Force Depot
   Attn: MPMTPR
   Mallory Air Force Station
   3300 Jackson Avenue
   Memphis 2, Tennessee

6. One (1) complete set of photographs (only) shall be forwarded to same address, ATTN: MPPPV.

7. This exhibit has been attached to PR or MIPR no. MP-60-3655-40820L

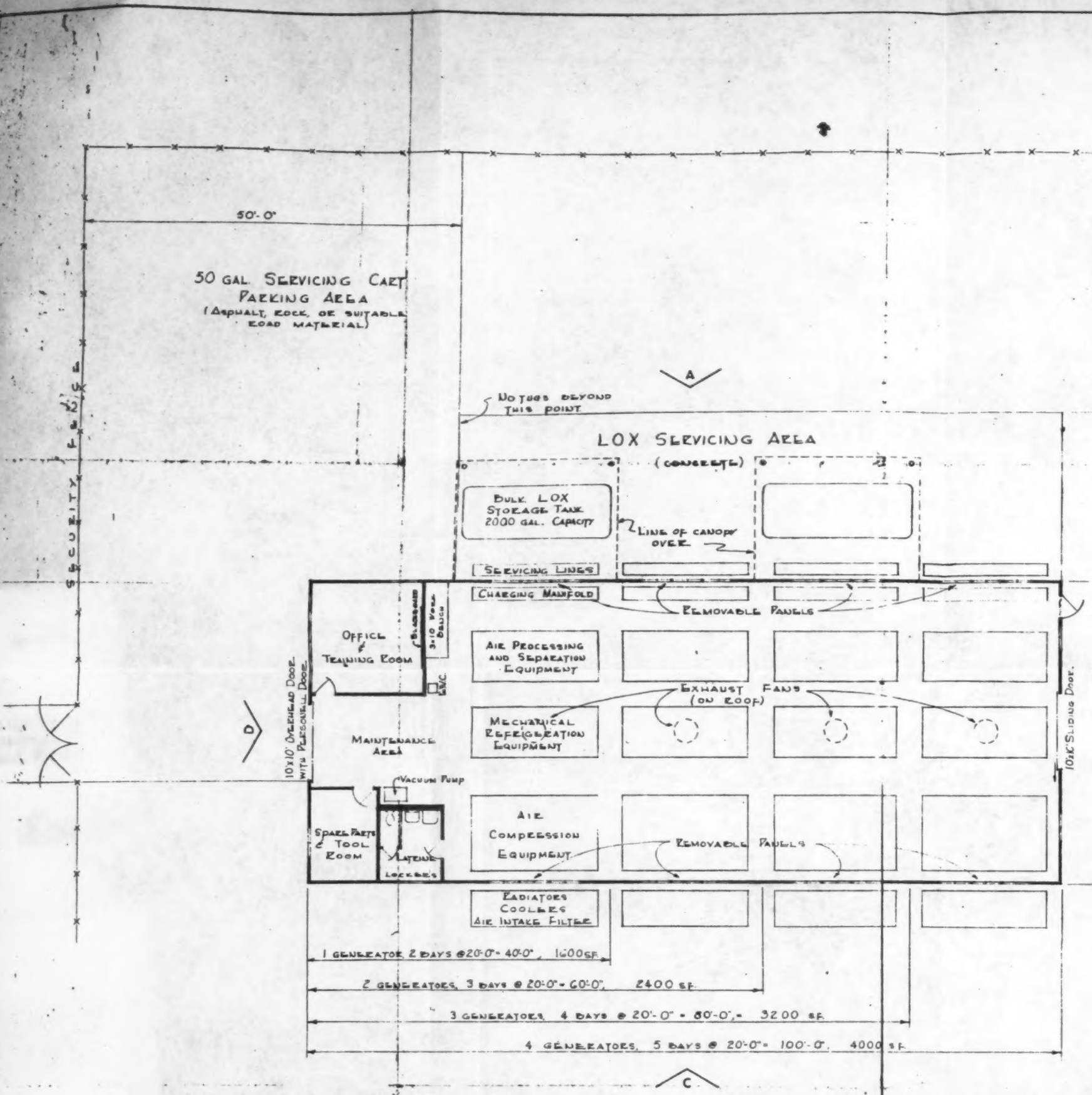
   on 7 December 1959

   BY Wm. Louie Cole

   Technical Data Office
   Memphis Air Force Depot
   Mallory Air Force Station
   Memphis, Tennessee
   Phone GLendale 8-4411, Ext. 538

Rev 16 March 1959

Exempt FC

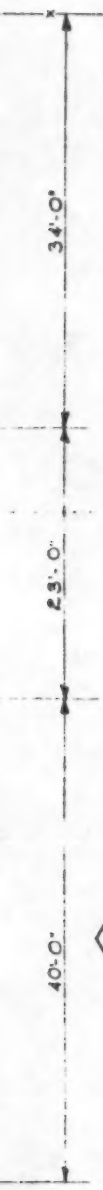


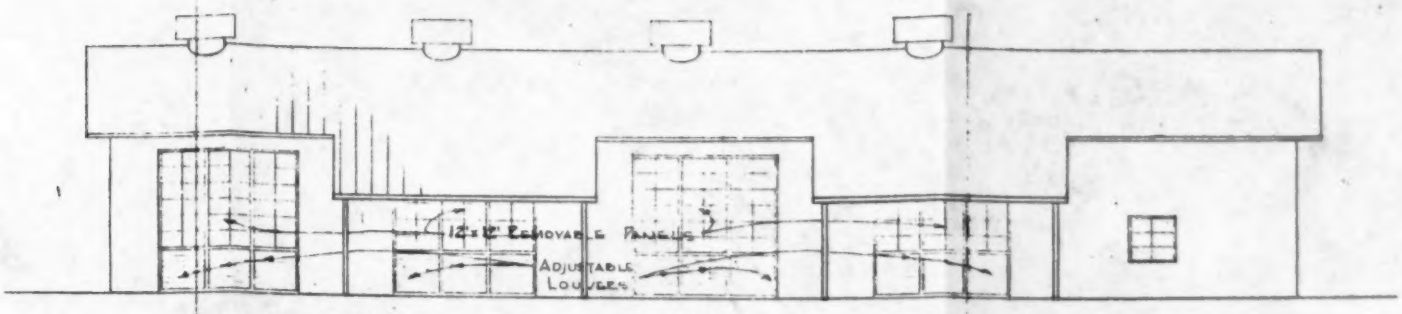

PLAN

SCALE: 1/8" = 1'-0"

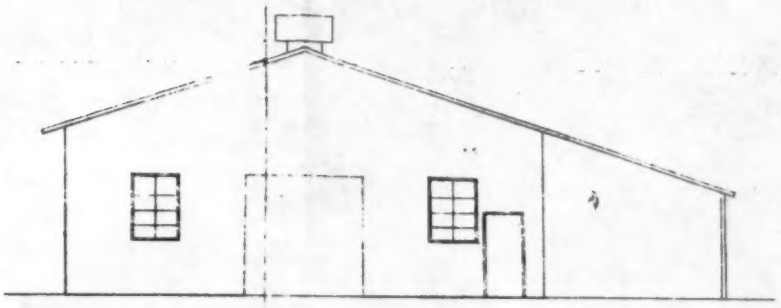
## NOTES:

1. BUILDING IS TO BE A COMMERCIALLY MANUFACTURED PREFABRICATED STEEL STRUCTURE. IT WILL BE A RIGID FRAME OR LOW RIGID FRAME TYPE HAVING A CLEAR SPAN OF 40'-0", SIDE WALLS 14'-0" HIGH, AND 20'-0" BAYS. ROOFING AND SIDING WILL CONSIST OF [redacted] STEEL OR ALUMINUM PANELS. ALL DOORS, WINDOWS, LOUVERS, VENTILATORS, ETC. WILL BE STANDARD ACCESSORIES OF THE PREFAB MANUFACTURER, OR STOCK COMMERCIAL ITEMS.
2. THE OFFICE AND TRAINING ROOM WILL HAVE FLUORESCENT LIGHTING.
3. PROVIDE 110v ELECTRICAL OUTLETS OVER THE WORK BENCH.
4. ALL OVERHEAD UTILITIES WILL BE KEPT AWAY FROM LOX SERVICING AREA.
5. MANUFACTURER WILL DETERMINE UTILITY REQUIREMENTS AND LOCATIONS FOR EACH GENERATOR.
6. IF THE BUILDING IS TO BE BUILT BEFORE THE 1½ TON GENERATORS ARE AVAILABLE, IT MAY HOUSE A-1A, A-1E, MA-1, OR MB-1 GENERATORS. REMOVE THE WINDOW AND LOUVER UNITS AT ONE END OF EACH BAY AND SUBSTITUTE A 12'-0"x12'-0" ROLL-UP OVERHEAD DOOR.
7. PROVIDE YA[illegible] AREA AND PARKI[illegible]
8. A CLASS [illegible] SECURITY AREA.
9. WHEN SPA[illegible] BE LOCATED IN T[illegible] LATRINE AREA.
10. ROOFING AN[illegible] STEEL, CORRUGATE[illegible] OPTIONAL BY THE C[illegible] WILL COMPLY WITH F[illegible] GAUGES AS INDICA[illegible]




ELEVATION A



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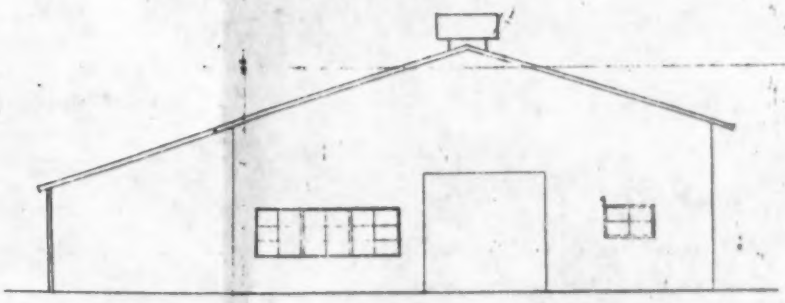
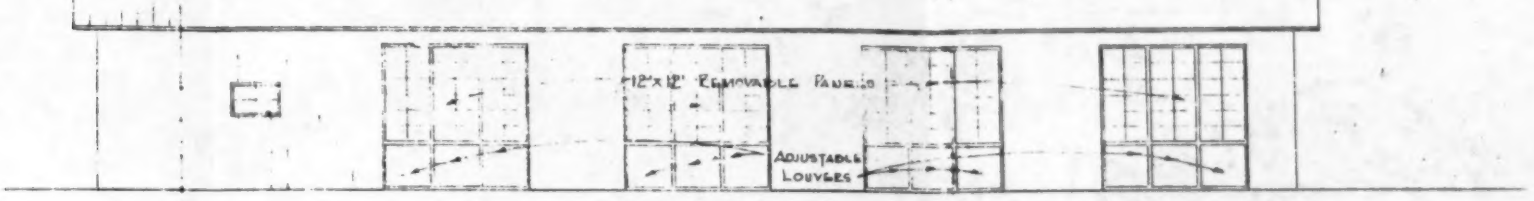


ELEVATION D




ELEVATION C

YARD LIGHTING FOR NIGHT OPERATION OF LOX SERVICING
ARKING LOT.
ASS II SECURITY FENCE IS REQUIRED IF NOT WITHIN A
A.
SPACE HEATING IS REQUIRED, THE EQUIPMENT MAY
N THE SPACE ABOVE THE OFFICE, TOOL ROOM AND
.
AND SIDING SHALL BE BLACK PROTECTED CORRUGATED
ATED ALUMINUM, OR ZINC COATED CORRUGATED STEEL. AS
E CONTRACTOR. ZINC COATED CORRUGATED STEEL
TH FEDERAL SPECIFICATION QQ-S-775, TYPE II, CLASS 3,
DICATED IN GUIDE SPECIFICATION CE-222.04, DATED 15 JUN, '59.

Approved Mark A. Mitchell Lt Col 21 Nov 59
PETROLEUM, BR, D/MAT

Approved Miguel Vigueira Civ 19 Nov 59
LOX TECH REP

Approved Peter O Putt Lt Col
POL BR DEEM

Approved Harley O. Mink
MECHANICAL ENGR

Dwg. by DJ Miller

Revised by SAC 7 Dec 59

STRATEGIC AIR COMMAND
DIRECTORATE OF CIVIL ENGINEERING

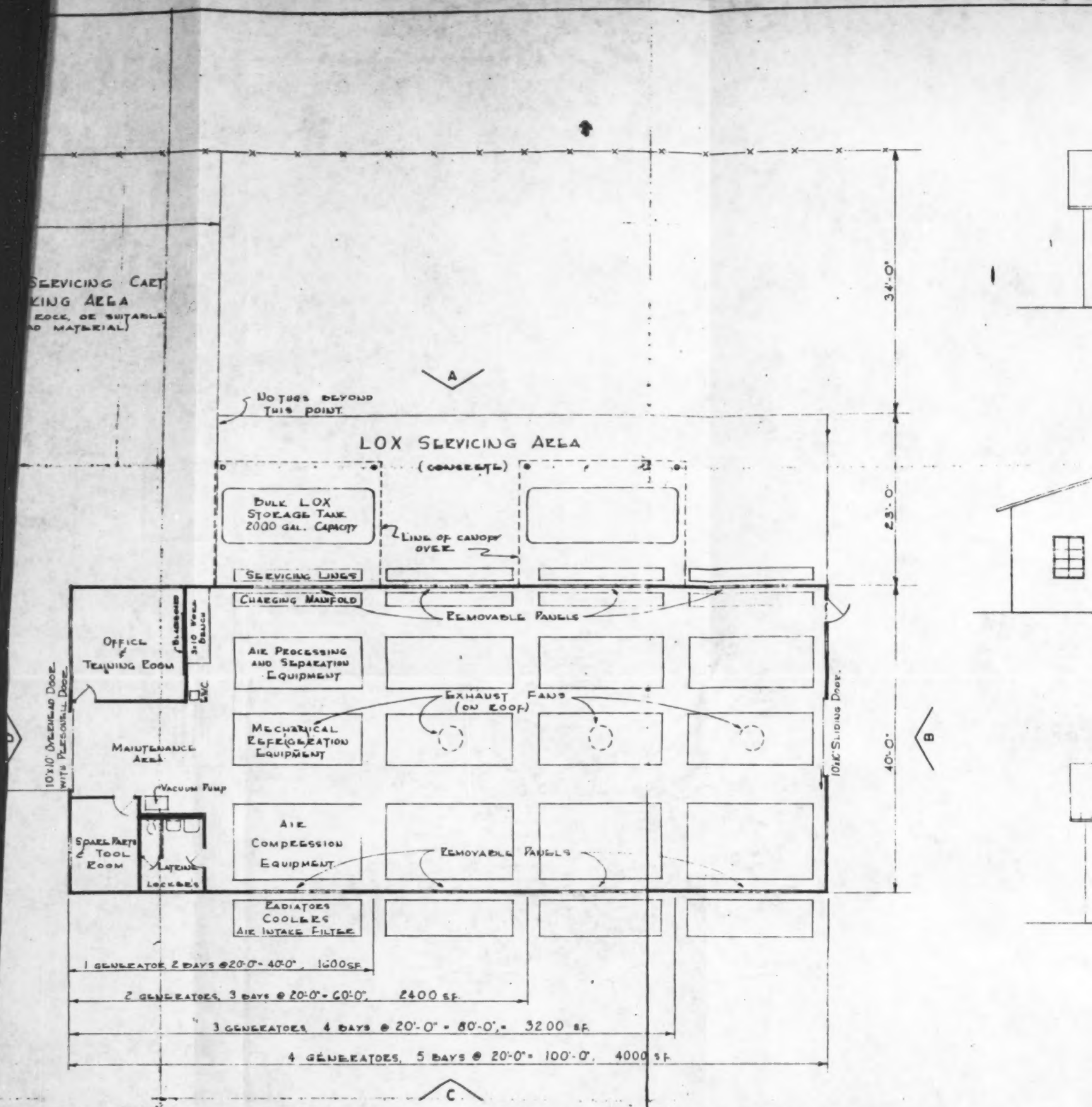
ENGINEERING DIVISION

AIRCRAFT SUPPORT LOX GENERATOR FACILITY, 1½ MW

SCALE: 1" = As Shown

DATE: 17 Nov. 1959

SHEET 1 OF 1

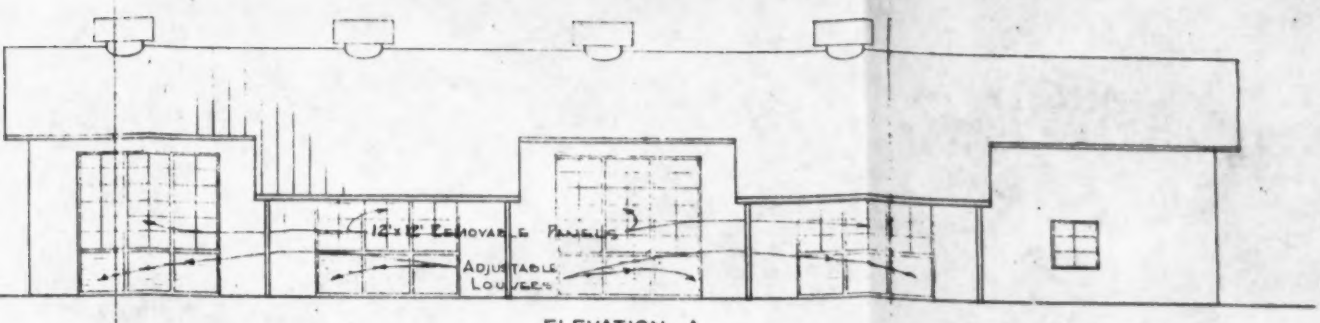



## PLAN

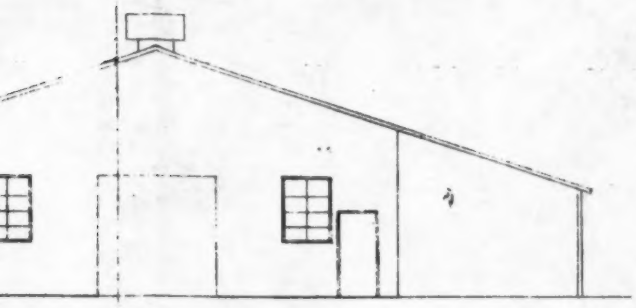
SCALE: 1/8" - 1'-0"

## NOTES:

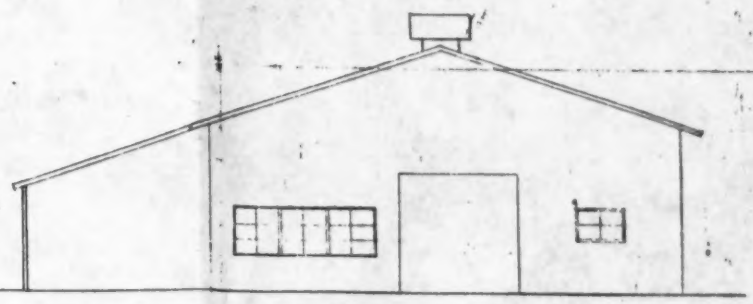
1. BUILDING IS TO BE A COMMERCIALLY MANUFACTURED PREFABRICATED STEEL STRUCTURE. IT WILL BE A RIGID FRAME OR LOW RIGID FRAME TYPE HAVING A CLEAR SPAN OF 40'-0", SIDE WALLS 14'-0" HIGH, AND 20'-0" BAYS. ROOFING AND SIDING WILL CONSIST OF [redacted] STEEL OR ALUMINUM PANELS. ALL DOORS, WINDOWS, LOUVERS, VENTILATORS, ETC. WILL BE STANDARD ACCESSORIES OF THE PREFAB MANUFACTURER, OR STOCK COMMERCIAL ITEMS.
2. THE OFFICE AND TRAINING ROOM WILL HAVE FLUORESCENT LIGHTING.
3. PROVIDE 110v ELECTRICAL OUTLETS OVER THE WORK BENCH.
4. ALL OVERHEAD UTILITIES WILL BE KEPT AWAY FROM LOX SERVICING AREA.
5. MANUFACTURER WILL DETERMINE UTILITY REQUIREMENTS AND LOCATIONS FOR EACH GENERATOR.
6. IF THE BUILDING IS TO BE BUILT BEFORE THE 1½ TON GENERATORS ARE AVAILABLE, IT MAY HOUSE A-1A, A-1E, MA-1, OR MB-1 GENERATORS. REMOVE THE WINDOW AND LOUVER UNITS AT ONE END OF EACH BAY AND SUBSTITUTE A 12'-0"x12'-0" ROLL-UP OVERHEAD DOOR.
7. PROVIDE YARD LIGHTING FOR NIGHT OPER AREA AND PARKING LOT.
8. A CLASS II SECURITY FENCE IS SECURITY AREA.
9. WHEN SPACE HEATING IS REQUIRE BE LOCATED IN THE SPACE ABOVE THE LATRINE AREA.
10. ROOFING AND SIDING SHALL BE BLAC STEEL, CORRUGATED ALUMINUM, OR ZINC COAT OPTIONAL BY THE CONTRACTOR. ZINC COATE WILL COMPLY WITH FEDERAL SPECIFICATION QQ GAUGES AS INDICATED IN GUIDE SPECIFICATI



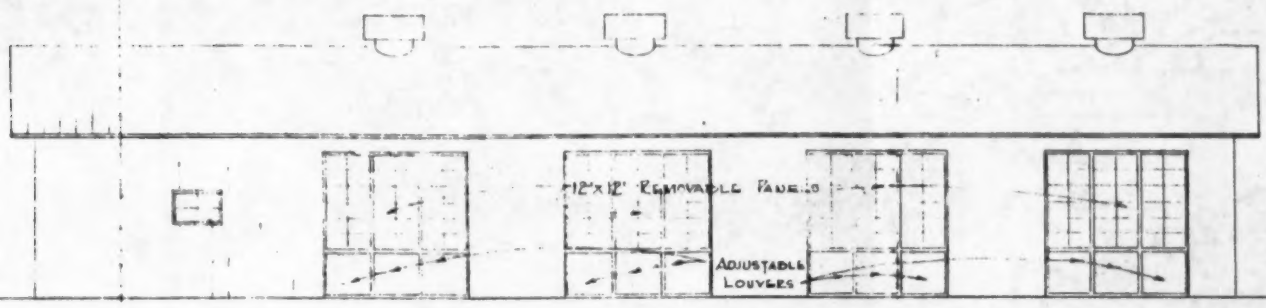

ELEVATION A



ELEVATION B



ELEVATION D




ELEVATION C

OPERATION OF LOX SERVICING

IS REQUIRED IF NOT WITHIN A

UIRED, THE EQUIPMENT MAY

THE OFFICE, TOOL ROOM AND

LACE PROTECTED CORRUGATED

COATED CORRUGATED STEEL. AS

DATED CORRUGATED STEEL

QQ-S-775, TYPE II, CLASS 3,

CATION CE-222.04, DATED 15 JUN, '59.

Approved Mark A. Mitchell Lt Col 2 Nov 59
PETROLEUM BR. D/MAT

Approved Miguel Vigueria Civ 17 Nov 59
LOX TECH REP

Approved Peter O Tuttle Lieut
POL BR, DEEM

Approved Harley A. Shirk
MECHANICAL BR, DE

Dewg. by RG Miller

REVISED BY SAC 7 DEC 59

**STRATEGIC AIR COMMAND**
DIRECTORATE OF CIVIL ENGINEERING

ENGINEERING DIVISION

AIRCRAFT SUPPORT LOX GENERATOR FACILITY, 1½ TON

W. M. Hill W. F. Bell
Asst to H. Co. W. Engr
Chief, Eng. Div.
2 Lt USAF
Approved
for CO. Maj. USAF

SCALE: 1" = As Shown
DATE: 17 Nov. 1959
DRAWING NO. SAC Sketch DAF-59
SHEET 1 OF 1

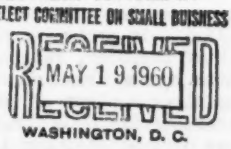
# APPENDIX IV

(Letter to the Committee from the Southern Oxygen Co. and enclosed correspondence between Pacific Oxygen Co., and the Air Materiel Command, Wright-Patterson Air Force Base.)

UNion 4-2345 P. O. BOX No. 5087 WASHINGTON 19, D. C.

May 17, 1960

The Honorable Alan Bible, Acting Chairman
Subcommittee on Relations of Business with Government
Select Committee on Small Business
United States Senate
Senate Office Building
Washington, D. C.




Dear Sir:

First, may I express appreciation for the courtesies extended to me and to others representing the Independent Oxygen Manufacturers' Association at the hearings conducted by your Committee to consider the justification for an order by the Air Force for seventy 1½-ton semi-permanent liquid oxygen plants.

If permissible, I would like to add this letter to the Committee Record for the purpose of clarifying several points not already covered or in controversy.

First, in order to establish our company or my personal qualifications, I trust you will pardon the following references showing areas of assistance and collaboration.

About 1930, Navy Lieutenant Apollo Soucek (later Admiral Soucek) came to our plant, then in Virginia, saying that he was trying for a world altitude record, but was hampered by the freezing of his oxygen supply, and requested my help. Ten days later, with dry oxygen produced by Southern Oxygen Company, Lieutenant Soucek gained his objective which stood for more than five years. I still treasure his personal letter of thanks.

About 1940, following a Navy test plane crash, I was called in to an investigation to determine the cause, and came to the conclusion that excessive moisture was the probable reason. During that investigation, the removal of valves from Navy and Air Force cylinders disclosed that a large percentage contained free water. Although the conditioning of cylinders was not our obligation under those contracts, I refused to deliver any more orders until our men had removed valves and dried all aviation cylinders. We also notified

Southern OXYGEN COMPANY



the Air Service and applied the same policy. It was interesting that we performed that service for more than three months at a substantial loss (never reimbursed) before either service paid us for that operation on subsequent orders.

As a result of that experience, we collaborated with the Navy in establishing a new aviation oxygen specification, later adopted for all services, and were given credit for that assistance during the presentation of a paper by the Navy before the Compressed Gas Association.

Within the past year a number of conferences have been held at our office by the Navy in an endeavor to determine reasons for nausea suffered by high altitude fliers breathing vapor oxygen coming from liquid oxygen supply systems through vaporizers to the members of the crew. The conclusion was that this resulted from accumulated methane in the system, occasionally released in substantial amounts depending on the changing rate of demand. As a result, new specifications were written establishing maximum allowable limits in parts per million on certain impurities such as methane. Our Chief Engineer, Maintenance Engineer and Research Chemist participated in these conferences and contributed to the final determinations. As a result, we installed a piece of testing equipment in a special room at a total cost in excess of $15,000. This instrument was used during the latter part of these discussions, and is now used to test liquid oxygen delivered and to monitor oxygen column operations. Work is still being continued to discover better ways and means of removing these troublesome impurities, which is a problem arising only in aviation.

These three cases indicate the value to the Armed Services of close technical collaboration with industry. Even where classified subjects are discussed, I am sure that those qualified experts from industry could be trusted and invaluable.

An added reason for this last reference is the strong doubt in my mind whether the 70 plants in the Air Force proposal will produce liquid oxygen with methane limits beneath that found to be desirable. A methane trap is mentioned, but seems to refer to the method of testing.

The proposed location of these plants, if placed on the edge of the airstrip or maintenance and engine testing area, certainly imposes a difficult burden on the purification equipment of these small capacity plants. We have found that in high humidity periods sources of methane as far as one-half to a mile distant from the plant air intake sometimes cannot be completely eliminated. The existence of this element must be monitored on highly complex, costly instruments which must be read by personnel who know how to interpret the record. I attach several sections showing records of the gases indicated. So I ask - will these 70 plants meet today's needs and will they be ably operated?

Southern OXYGEN COMPANY



The Honorable Alan Bible

May 17, 1960

Now I come to the basic reason for the claim of General Southerland that he must have liquid oxygen production facilities on the base for reasons of national security. I am inclined to raise the question whether dependence on such plants may not place national security in jeopardy.

I think we may assume that there is no question of dependability in peacetime, though possibly one of gas purity, which through a brief period of lax operation may contaminate large quantities of stored LOX.

If war comes, what could happen? One bullet or shell fragment could put the plant completely out of operation. Repairs to the producing column could require weeks. The same is true of the storage facility, if exposed. I believe Air Service testimony was to the effect that small portable storage vessels are used. In any case, I would advise a remote location of production and storage, with 500 gallon truck mounted units for servicing.

If that policy is followed, the argument in favor of base production facilities begins to fade. Especially so if it is remembered that during an emergency private industry's mobile truck transports could be pressed into service.

With regard to the question of radiation effects, the operation of a plant on or near the base would have to be discontinued immediately, furthermore, the hoses, service trucks and fittings would have to be decontaminated. However, in our opinion, the liquid oxygen stored in a vacuum type, insulated tank would not be affected, and could be used if new or uncontaminated hoses, etc., were stored so as to be available in such an emergency.

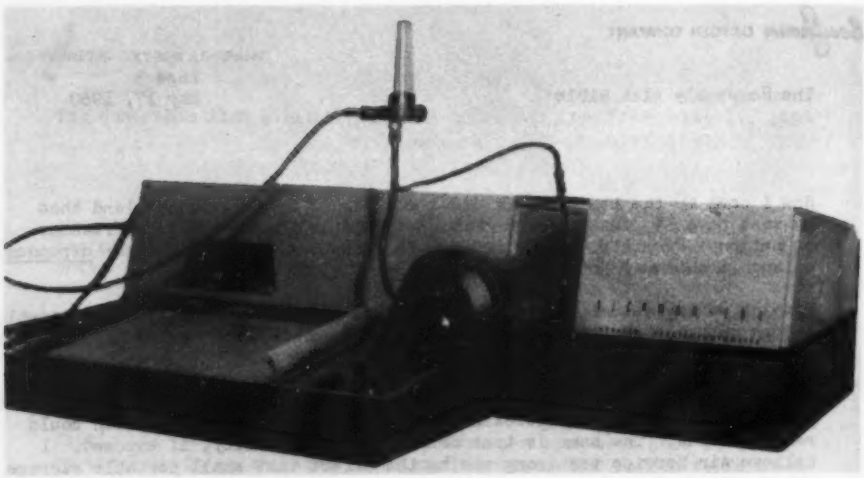
In war, I would expect a base unit to be a very dubious source of dependability, what with limited operating skills and engineering supervision, where one or more mistakes might contaminate the gas supply at the very moment it was most desperately needed.

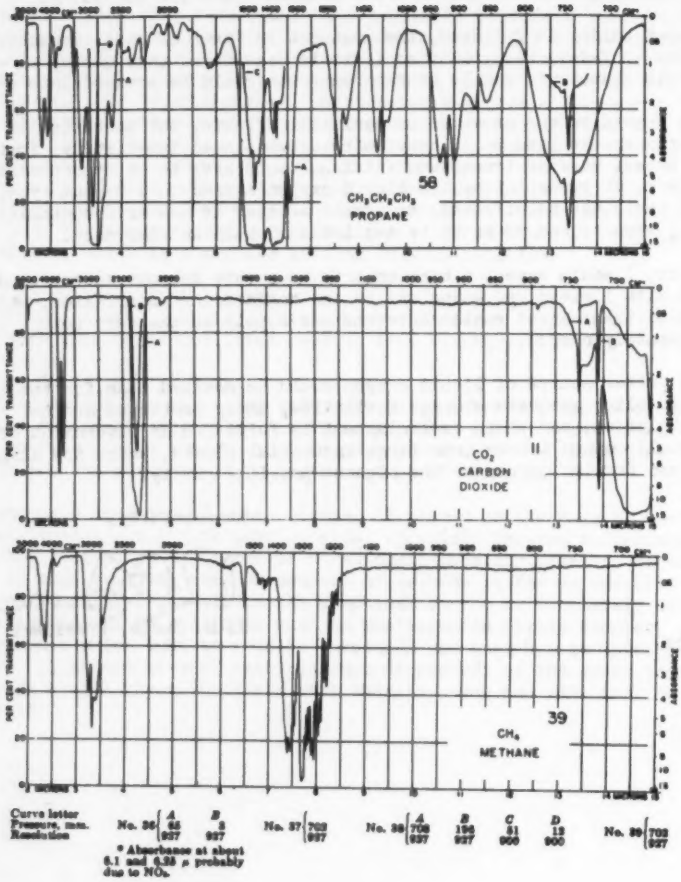
What better source of liquid oxygen could be devised than for the Air Force to establish adequate storage facilities, amply protected against enemy capabilities, and where replenishment is furnished in Government or commercially owned trucks from large industrial plants, which are dispersed and can furnish oxygen to the highest possible purity.

Respectfully,

R. B. Swope, President

RBS/bb




PER CENT TRANSMITTANCE
ABSORBANCE
MICRONS
$CH_3CH_2CH_3$
PROPANE
58
$CO_2$
CARBON
DIOXIDE
11
$CH_4$
METHANE
39
Curve letter
Pressure, mm.
Resolution
No. 56
No. 57
No. 58
No. 59
* Absorbance at about 6.1 and 6.38 μ probably due to $NO_2$.

OAKLAND, CALIF.
March 30, 1956

Wright - Patterson Air Force Base
Dayton, Ohio

Att: Commanding Officer

Gentlemen:

Through the Compressed Gas Association we have learned that the Air Force is experiencing some trouble with odor in Liquid Oxygen.

The way we process our air supply before liquifaction and during separation, though more costly, gives us an odor free product. We made a crude test by evaporating a cubic foot of Liquid Oxygen and smelling the residue.

If the Air Force would supply odor-free containers we would be happy to supply, free of charge, up to 10 tons Liquid or 240,000 cubic feet of Oxygen for experimental purposes. Should the Air Force find a noticeable difference in the Oxygen you are welcome to make further tests and checks in our process to determine how the odor might be eliminated from your suppliers of Liquid Oxygen.

Very truly yours,

PACIFIC OXYGEN COMPANY

William Josephian, Pres.

WJ:vs
cc: San Francisco Air Procurement Dist.
McClellan AFB, Calif.

HEADQUARTERS
AIR MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

26 APR 1956

Pacific Oxygen Company
2205 Magnolia Street
Oakland 7, California
Attn: Mr. William Josephian, President

TO SPEED DELIVERY OF YOUR REPLY, PLEASE ADDRESS COMMUNICATION TO ATTENTION OF
MCQDC

Gentlemen:

This Headquarters appreciates your kind offer of 30 March 1956 to supply, free of charge, up to ten tons of liquid oxygen for test purposes in connection with our problem with odor in liquid oxygen. The Environmental Health Laboratory of this Headquarters is currently procuring and installing test equipment for the precise analysis of trace contaminants in oxygen. After this installation is completed, we may be very much interested in obtaining a sample of your liquid oxygen for test. We will advise you later if the samples are desired.

The odor problem with respect to liquid oxygen has apparently been restricted to a single location. Our method of test is similar to the method employed by your company and the odor noticed is similar to gasoline. It is believed that hydrocarbon vapors are being condensed in the liquefaction process and remain in suspension or solution in the liquid oxygen.

We feel that it may be necessary to process the air supply through an adsorbent such as activated carbon to remove hydrocarbons in those areas where the atmosphere is significantly contaminated by hydrocarbon vapors. Should you feel at liberty to disclose details of your air supply processing, we would be very interested in learning what your approach to this problem involves.

It is suggested that in the interest of prompt reply, future correspondence on technical matters with respect to oxygen be addressed as follows:

Commander
Wright Air Development Center
Wright-Patterson AFB
Ohio
Attn: WCLKP-4

Sincerely,

CLAIR A. PETERSON
Colonel, USAF
Chief, Quality Control

AC Form 9, 28 Aug 52

"MORE AIR FORCE PER DOLLAR"

May 4, 1956

Commander
Wright Air Development Center
Wright-Patterson AFB
Ohio
Attn: WCEF-4

Gentlemen:

Regarding the odor problem in Liquid Oxygen, I believe the first step should be to find out if our oxygen is noticeably different than other sources of supply. If there is a difference we can go into the matter in more detail. For instance, air samples can be taken before washing with caustic soda, before compression, after compression, after activated carbon oil absorbers, after air dryers, before solva bead absorbers, and finally the product to find out where the contamination enters the system and where it is taken out.

I know that there is hydro-carbon traces before the solva bead absorbers, because we used to use liquid air for the crude Argon separation unit and detected odors which we were able to condense and get a clear volatile liquid.

Very truly yours,

PACIFIC OXYGEN COMPANY

William Josephian, Pres.

WJ:vc

January 30, 1957

Mr. Hardin Hovey,
Chief, Fuel, Lub. & Chemicals Branch,
S. P. Air Procurement District,
W. Grand Ave. & Maritime,
Oakland, California.

Dear Mr. Hovey:

This letter is just to put in writing my observations while checking odors in Liquid Oxygen on our delivery of Liquid Oxygen to Castle Air Force Base December 16, 1956.

A fair sized sample (the more the better) but in no case less than 300 ML, should be used.

The smell test should be in an area without wind or draft.

Odor will be strongest just after all the Liquid Oxygen is evaporated and the sample container warms just a little.

When smell test is being made, inhale only near sample. Never exhale into sample.

Tip beaker and smell within 1/2" of the lower side, so that the cold vapor in the beaker can be sampled.

In the portable plant at Castle AFB, I noticed that the air compressor for the column was air-cooled and I would guess that the intercoolers were air-cooled, too. I also noticed the paint had burned off the cylinder heads. High temperature in compressing air causes the lubricating oil to crack and hydrocarbon gases to be made. The air dryers will take some of this out and hold it, then when the dryer nears the end of its run, it will release the hydrocarbon gases and absorb water, passing the gases through the column.

Liquid Oxygen should be passed through either silica oil or Mobil bead purifier to remove impurities. Flow rates and absorption capacity can be secured from the desiccant manufacturer.

Because purifiers are installed is no guarantee of odor-free oxygen. It must always be checked.

To Mr. Hardin Hovey

While waiting for Captain Fullerton, I couldn'thelp seeing in the distance those big beautiful planes costing millions of dollars each. Then looking at the liquid Oxygen facility, I was distrubed to see such limited storage capacity. It would be wise to install a large storage tank, holding 750,000 to 1,000,000 cubic feet of Oxygen in the liquid state. Then truckload shipments of Oxygen could be delivered at a much lower unit cost. But more important, odor-free Oxygen would be on the field and ready for use.

We estimate an evaporation rate of .25% per 24 hours, so it would take a year to lose a full tank of Liquid Oxygen by evaporation.

Large storage tanks should be installed in all fields where, in case of emergency, the Liquid Oxygen would be ready for use.

Thinking further on the problem, of course it is desirable to have odor-free Liquid Oxygen, but suppose a flyer got a bad batch of liquid. It is of no help to him at that time to put the blame on somebody down below. He has to have oxygen.

I have checked a number of times and notice that as long as the evaporator (heat exchanger in our gas columns) is cold, the odors are frozen in the evaporator and the Oxygen smells fresh. If it is possible for the Air Force to install a bleed-valve near the flyer, he can let enough Oxygen out to the atmosphere to freeze the impurities in the evaporator so that he can have breathing oxygen without odor.

I have already verbally covered these points with the inspectors who call on us, but delayed writing this letter in the hope that we would have testing equipment operating by this time. It looks now like another 60 days before we even receive the equipment which we have purchased to analyze hydrocarbon gases in Oxygen. But we have no assurance that it will give us the answer after it arrives and is in use.

We checked into Mass Spectrometers as testing units several years ago, but found them very tempermental instruments which should be operated only by a Scientist who does this work every day and who knows the peculiarities of the machine. Due to the low vacuum necessary in a Mass Spectrometer, outside air always seems to get into the system, giving a high nitrogen and argon content.

Yours very truly,

PACIFIC OXYGEN COMPANY

William Josephian, Pres.

cc: Capt. Fullerton
McClellan Field
Col. C.A.Peterson